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BULLETIN No. 2

ISSUED BY

State Board of Viticultural Commissioners.

June 15, 1914, at Sacramento, Cal.

To the Growers, Packers and Shippers of California Table Grapes:

Let us have your hearty co-operation this year and at once in the matter of an attempt to better our table grape markets in the United States and Canada the coming harvest season.

The Viticultural Commission of California believes, after thorough investigation, that hasty shipments of unripe table grapes into the Eastern markets are doing us an injury in returns to the extent of $500,000 per annum.

Let us get together this season and stop the practice. We advise that no table grapes be picked and packed until they test 17 per cent in sugar.

The Western Fruit Jobbers' Association of America is with us in this effort, and promises fullest support. The California handlers of our grapes are agreed that the movement is right and will be productive of good results.

Let us all show that *legislation will not be required* to make us do what is for our own good and for California's reputation as the State producing the best table grapes in the world.

The crop is big. Estimates indicate that it may reach a total of 8,000 carloads, or nearly 2,000 more than went East last year, in the event that damage does not come to the crop between now and the harvest season.

Notwitstanding this condition, the markets should be good if we are careful of what we send. The deciduous fruit of the East and North, which in a measure competes with our exports from California, is not up to normal. In the North, pears, at the present writing, are not 60 per cent of last year's crop. Italian prunes are scarcely one third of a normal crop. Peaches are good and the apple crop immense.

In the East, Georgia expected 5,000 cars of peaches and will not have over 3,000. New York state and Connecticut had 5,000 cars to ship last year, and their crop is a failure this year. They will not have enough for local use. These crops do not come into the markets in vigorous competition with our grapes, but the shortage is a factor in general marketing conditions in the East this year.

The first table grapes are going out of the Imperial Valley this month of June, and everything points to the use of utmost care in the matter of picking at the proper time when the sugar content is sufficient.

For the information of our table grape growers we publish the fol-

lowing resolution, adopted at the annual convention of the Western Fruit Jobbers' Association of America, in Kansas City, last February:

SHIPMENT OF UNRIPE GRAPES.

WHEREAS, The State Board of Viticultural Commissioners of California, appointed by Gov. Hiram W. Johnson for the purpose of conserving the table, raisin and wine grape industry of the State, has been engaged in an endeavor during the last three months to improve conditions of California table grapes; and

WHEREAS, After thorough investigation, the Viticultural Commission finds that much injury has come to the table grape industry of California through early shipments of unripe table grapes to almost every section of the United States; and

WHEREAS, These hasty shipments of green and immature table grapes from California have the effect of depressing prices and injuring the demand in all sections after they have reached the consumer; and

WHEREAS, This practice works an injury and entails a loss both to the producers and the shippers of these grapes, and in many cases creates the fallacy that the fruit shipping firms and Eastern distributors are to blame in connection with salesmanship ability; and

WHEREAS, The said practice is an absolute injury to the reputation of California as the state producing the finest table grapes in the United States; therefore, be it

Resolved, That we, the Western Fruit Jobbers' Associataion, in convention assembled this sixth day of February, 1914, do proclaim that we are in hearty accord with the work of the Viticultural Commission of California, and will do everything in our power to co-operate with the Commission in an honest and earnest endeavor to have abolished entirely the practice of shipping green and unripe table grapes out of the State of California and into the hands of the members of our association.

I hereby certify that the foregoing resolution is a true and exact copy of the resolution adopted by the members of the Western Fruit Jobbers' Association of America, at their tenth annual meeting, held in Kansas City, Mo., February 4, 5 and 6, 1914.

(Signed) WILLIAM D. TIDWELL, Secretary.

This means that the shipping companies handling the table grape crop in California, and the distributors receiving our carloads in the eastern centers, are a unit in favor of the establishment of a minimum sugar standard for our grapes, and will co-operate with us to that end.

It may be of interest to our grape shippers to read extracts on this subject from the address of E. M. Sheehan, secretary of the State Board of Viticultural Commissioners, delivered at the California State Fruit Growers' Convention, at the University Farm at Davis, June 4th. We quote some of them, as follows:

In our office at the State Capitol, we have upward of two hundred letters, from practically all of the distributing houses and

handlers of California table grapes throughout the United States and in some parts of Canada, telling us if we could control the early shipping of our table grapes and prevent the attempt to market unripe grapes, green and unfit for human consumption, we would accomplish a result for the growers that would net them handsome returns.

It is claimed by one firm, enthusiastic over the effort we are making, that $500,000 would be the additional yield of the table grape crop if there were a strict regulation enforced at the shipping point so far as the sugar content of the grape is concerned. One distributing house aptly describes the unfortunate result of hastily harvesting and shipping by declaring that the first grapes have left "a sour taste in the consumers' mouths," and that they shy away from California grapes for two or three weeks, thus hurting the market when the grapes are in thoroughly good condition. Skepticism has, therefore, spoiled the market for worthy offerings that come later.

The membership of the Western Fruit Jobbers' Association includes practically every fruit shipping concern in this state and most all of the eastern distributors of our table grapes and deciduous fruits. Therefore, we have gained one big point in our attempt, and all that we need now is the support of our vineyardists who grow these table grapes. If we show them that the gross returns and the net returns will be greater by stopping the practice of shipping unripe table grapes early each season, we may reasonably expect their sympathy and support in this laudable effort. There are undoubtedly some, however, who will try to take advantage of the situation, prompted only by a selfish motive and with no consideration for the general good. These are the people who have it in their power at present to spoil markets for the honest, consistent shippers, and if there is any way for us to reach those who would break up the necessary co-operation, we intend to take advantage of it by appealing to the shipping concerns that are handling the crop. If there is money to be saved to the vineyardists in general, we want to accomplish that happy result.

The grapes that are most apt to mislead the consumer are those of green cast. The yellow tinge when the berries are well along in sugar is overlooked, and the consumer will bite into the grape believing it is in condition to eat. He will find that it is very sour, and that will be the end of his grape buying for several days. Necessarily this experience puts a damper on the consumption and the market for a certain period of time, during which other grapes may arrive in the same market in very good condition. The demand ceases temporarily on these better grapes, and the shippers who forward them experience poor results.

Not so much trouble is experienced with grapes that show some touch of color when they are nearing the ripening period. This is particularly true of the Tokay; although it is also a fact that in some of the southern districts of the State the Tokays are well

along in sugar before they show the flame, or red color. In the south, we find the Tokay grapes with scarcely any color at all even when they are quite ripe; while in the north, in the Sacramento and San Joaquin valleys, the reddish tinge appears early. As said before, however, the Malaga, Muscat, Thompson's Seedless and other varieties of the greenish cast are the ones that are most apt to deceive the consumer.

The Viticultural Commission believes that table grapes should not be offered for sale until they have attained at least 17 per cent in sugar; and to-day I take advantage of the opportunity of presenting these facts to you in the hope that the discussion which may follow will give us food for thought and many good ideas and suggestions as to what course we should pursue to correct what we believe to be an evil of the shipping business in this State which should be dealt with carefully and at the same time with effective results.

Trusting that this general appeal to the shippers and growers of California will be met in proper spirit and that compliance will be readily forthcoming, we remain, respectfully,

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. WETMORE, President.

E. M. SHEEHAN, Secretary.

STATE BOARD OF

VITICULTURAL COMMISSIONERS

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BULLETIN NO. 3.

THE GRAPE IN CALIFORNIA.

Report of the State Board of Viticultural Commissioners

Issued January 25, 1915, at Sacramento, California

This report, touching on the various phases of viticulture, is issued by direction of the State Viticultural Commission in order that those interested in grape growing may become acquainted with the very latest information in possession of this commission, which is devoting its time exclusively to the interests of the grape industry in California.

VINEYARD ROSTER AND ACREAGE IN VINES.

Slowly but surely, with the financial means available, the roster of vineyardists of the state is nearing completion. If we were able to send representatives into every grape growing section and go over every piece of vineyard property, we would have gathered our information much more rapidly; but the task has been undertaken through the mails, and the returns are, therefore, slow. Ultimately, however, this register of people who own vineyards will be complete, and it will give not only the names and post office addresses, but the extent of the vineyards and the varieties of the grapes grown as well. Once completed, it will enable us to communicate directly with every owner of a vineyard in the state, and will be an invaluable record in this office.

Those who have not sent in their vineyard data are requested to do so promptly in order to help this department.

In this connection, it will be interesting advance information to the public to know the amount of vineyard acreage in each county reported to date by the individual owners and growers, as well as our original estimate of 1913 set opposite, indicating the total acreage that would be eventually reported in detail.

Counties	Reported in detail to January 1, 1915, acres	1915 estimated total, acres
Alameda	3,831	5,000
Alpine		20
Amador	1,051	700
Butte	290	600
Calaveras		500
Colusa	1,534	1,100
Contra Costa	772	6,600
Del Norte		
El Dorado	568	800
Fresno	47,793	110,000
Glenn		50
Humboldt		10
Imperial	720	800
Inyo		90
Kern		900
Kings	5,740	11,000
Lake	290	400
Lassen		
Los Angeles	3,666	6,000
Madera	3,174	3,500
Marin	20	250
Mariposa	10	60
Mendocino	2,307	2,000
Merced	193	3,000
Modoc		
Mono		5
Monterey	12	150
Napa	6,291	13,000
Nevada	297	200
Orange	97	600
Placer	4,661	2,500
Plumas		
Riverside	2,210	3,000
Sacramento	16,651	20,000
San Benito	487	400
San Bernardino	12,611	16,000
San Diego	2,467	2,500
San Francisco		10
San Joaquin	14,956	45,000
San Luis Obispo		550
San Mateo	15	300
Santa Barbara		400
Santa Clara	11,723	15,000
Santa Cruz	1,679	2,000
Shasta		250
Sierra		
Siskiyou		5
Solano	2,079	3,000
Sonoma	10,406	24,000
Stanislaus	3,417	5,000
Sutter	5,244	4,500
Tehama	1,600	2,000
Trinity		7
Tulare	5,953	12,000
Tuolumne	46	250
Ventura	77	100
Yolo	4,821	5,000
Yuba	668	400
Totals	180,427	331,507

In the above tabulation it will be seen in several instances that the acreage already reported to us by individual growers exceeds our original estimate as to the total acreage in a number of counties. We believe, however, that in other sections our estimate may be found to

be somewhat in excess of the total acreage that will be reported from the individuals.

We have no reason at this time to change our original ideas in relation to the total acreage in grapes in the state, or the segregated totals by varieties. There are about 330,000 acres of vines in California. About 170,000 (slightly over one half), are wine grapes; 110,000 acres are raisin grapes, and 50,000 acres are table grapes.

Classification of Varieties and Sections.

It is a difficult task, and rather optional, when one attempts to classify the many varieties into table, wine and raisin segregations. A Muscat grape in one section will be used exclusively as a wine grape. In another section of the state it will be cultivated and harvested principally as a raisin grape. A similar condition applies in the case of Thompson's Seedless, Sultana, Feher Szagos, Malagas, and other varieties. Our classifications later on when all returns are in will be made with particular regard to the districts, or counties, in which the grapes are growing.

Napa, Sonoma, Contra Costa, Alameda and Santa Clara counties produce the bulk of the best table, or dry wines, in the state. The great Sacramento and San Joaquin valleys with southern California produce the sweet, or fortified wines.

The table grape centers are Sacramento, San Joaquin, Fresno and Imperial counties; and the raisin centers are Fresno, Madera, Kings and Tulare counties, with some production in Sutter, Colusa and Yuba counties and in the southern part of the state.

TABLE GRAPE TOPICS.

The table grape season of 1914 has not been a gratifying one to the growers or shippers, and this office hears a variety of opinions expressed as to the cause of poor returns. Overproduction seems to be the very general contention, and yet there are many who think the system of marketing and distribution may be at fault. The subject is worthy of closest investigation, and the Viticultural Commission hopes to be able to help the situation and offer advice after thoroughly considering all of the facts. A brief review of the angles, obstacles and possibilities are here presented.

In the first place, keen competition from Eastern grape producing sections of the United States is an element that must be reckoned with in the marketing of our table grapes. The same element has practically no effect on our raisin industry, and very little effect on our wine grape and wine making situation.

Tonnage of Table Grapes.

During the season just past, there were 8,473 carloads of crated table grapes packed and shipped out of the state. The average car contains 925 crates; and the average net weight of grapes in a car is 26,000 pounds, or 13 tons.

There were also sent to the Eastern markets 300 carloads of grapes preserved in sawdust in kegs and drums. The average car contained 520 drums; and the net weight in each drum was about 30 pounds.

In addition, we estimate that 1,000 carloads of table grapes were consumed in California, or sent by express shipment to neighboring states, and we arrive at a grand total of 125,000 tons of grapes consumed in the table grape markets of the United States and Canada.

There are only 50,000 acres of table grapes in the state, and the total production can safely be estimated at 250,000 tons. In a normal season, about one half of the table grape crop is sold in crates throughout the country. The balance finds its way to the wineries in the later part of the season when the selling prices become unsatisfactory, and with the culls and second crop grapes makes up the other half which is not shipped for table consumption.

Returns to Growers Disappointing.

The table grape returns during the season just past were most discouraging. Over 2,000 more cars were shipped than in 1913, and we have learned from the shippers in the state that of the 8,473 carloads we packed in California, fully one half of them netted the growers either a loss, or nothing at all. The grapes were gathered and packed, and the returns in fully half the volume of business done not alone did not net the producer any profit, but did not recompense him for pruning, cultivating and harvesting his crop.

In 1913, the conditions were reversed, and there was profit to the table grape producers. There were sent into the Eastern markets 6,365 carloads of grapes and they found ready and remunerative sale because of a short crop of Eastern grapes and a heavy demand for Concords and white varieties on the part of manufacturers of Eastern grape juice. Competition for the grapes of Ohio, Michigan, Missouri, New York and other states on the part of the grape juice people was so lively that a great bulk of the short crop went to manufacturers. This opened up a better market for our table grapes, and California producers enjoyed a profitable season.

Last fall, when we began to ship our crated table grapes we found a changed conditions in the East. There was an abnormally large crop of Eastern grapes. The grape juice manufacturers had overbought themselves in 1913, and there was little demand for the 1914 grape crop. The bulk of the 1913 grape juice was still on hand unsold, and there

was no competition on the part of the makers of grape juice for new grapes. Along came the California grape crop increased nearly 40 per cent over the previous season's production, and from almost the very first of the season reverses were met and a disappointing and discouraging season was the result.

The gross figure realized from the sale of crated table grapes in the Eastern markets from California was about $7,500,000. On an average, after deducting freight, refrigeration, selling commission, crates, packing and labor in shipping, the grower received a small sum which did not compensate him fully for the plowing, pruning, cultivating and harvesting of his crop, or by way of taxes and interest on his investment.

Hope of Improving Marketing.

It may be that distribution in the marketing is not thorough enough, and that something of good may be accomplished along this line of thought and action before another season. At times when the great Eastern marketing centers have a surfeit of our table grapes, smaller communities not so accessible have none at all to attract the attention of the consumer. Our own great shipping concerns are not to be criticised for this condition, because they must forward our grapes in car lots to cities that consume a carload, or more, and depend on the purchasers there to make further distribution. This is accomplished to a limited extent, but there is room for great improvement in the method and thoroughness of exploiting the smaller markets, and it is our intention to take up the subject directly with the individual distributing houses in the Eastern centers from now until next vintage in a vigorous endeavor to reach the smaller avenues of trade that might welcome an opportunity to buy our grapes in season. A Gurney system of distributing in small towns along railroad lines might be one of the ways of accomplishing results; and at any rate this commission will have an excellent opportunity of inaugurating this work by presenting its views on table grape marketing to the annual convention of the Western Fruit Jobbers' Association in Los Angeles from February 15th to 20th. All the leading handlers of our table grapes in the United States are members of this national organization and will be represented at the convention. In this way an effective start may be made and much good accomplished. The influence of this organization assisted us greatly in our effort to bring about a sugar standardization last year for our table grapes, and we now wish to go ahead along the lines of better and more complete marketing.

Sugar Standardization.

One of the most effective accomplishments of the commission has been the standardization of table grapes. This was done in a very successful manner during the past vintage with the assistance of the fruit packing companies throughout California, and to very great extent the growers of grapes.

In addition to this, the Eastern marketers of our California table grapes were made aware of the efforts here, and the Western Fruit Jobbers' Association in convention last February, in Kansas City, applauded by resolution the efforts of the commission and advised that every handler of California table grapes should use his influence to bring about the desired result in the standardization of our Tokay, Malaga and Muscat table grapes.

The general source of trouble came from the shipping of the early varieties of table grapes. From almost every section we found growers anxious to put their grapes into market early, regardless of their sugar content. This practice demoralized the Eastern market because of the bad impression created by early unripe grapes. Shippers who followed these early exports with better grapes and better sugar content found their product almost refused because of skepticism of the consumer brought about by the bitter experience with the first shipment of unripe grapes.

Packing Grapes in Sawdust.

As a matter of fact, thousands of acres of table grapes were gathered and sent to the wineries the past season because of fear on the part of the growers that they would realize no net profits after having packed and shipped their table grapes to the Eastern market centers.

At the present time, the commission is greatly concerned about the table grape situation in California, and is endeavoring to relieve what appears on the surface to be an overproduction of table grapes in the state. We learn that Spain sends to the United States for winter marketing each year nearly 750,000 kegs or drums of Almeria table grapes packed in corkdust. These grapes from Spain have found a ready market all through the Eastern section of the country in the winter season, and have arrived here in a very good state of preservation. The prices realized have been entirely satisfactory, and we have thought if we could lay aside a certain proportion of our table grapes each vintage season for marketing in the East throughout the winter and spring months we would relieve the situation in this state.

The experiment has been tried this year in California to a very practical extent, and our best information is that there were packed here during the vintage season just past over 150,000 kegs or drums of Emperor grapes. There was some packing also of Tokays. We do not

have corkdust to use as a preservative, but we substituted kiln-dried redwood sawdust, and we packed our grapes into this material in spruce kegs and veneered drums. The actual weight in a keg, or drum, was about 30 pounds, and the cost of the drum, the sawdust and the packing was 85 cents. Reports from the firms in California that tried the experiments extensively indicate that these grapes have brought $2.25 f. o. b. California. If the cost of packing were 85 cents per drum, the net figure to the grower for 30 pounds of grapes would be $1.40, which is a very satisfactory price. This figure does not mean, of course, net profit, nor does it mean that every grower who shipped in sawdust received the figure above mentioned for all of his grapes. Many kegs and drums not carefully packed arrived in bad condition, and some of the grapes were not marketable at all.

The Tokay Problem.

Opinions vary among growers as to the possibilities of our Tokays in this form of marketing, and it is a very important debatable subject at this time, particularly to the vineyardists in the Sacramento and Lodi sections where the bulk of the Tokays are grown. These are the table grapes that are apt any year to clog the Eastern markets, and if a goodly percentage of the yearly crop could be marketed under sawdust preservation, there would undoubtedly be a better market for the fresh crated Tokays. We shipped some of them last season in sawdust, but the results were unsatisfactory. They did not keep as did the Emperors, and there are many of our prominent growers ready to admit now that the Tokay will be a failure as a variety that would stand the sawdust method of preserving. The berries seem brittle and ready to split at times, and when this occurs in the keg, or drum, the contents of the entire package is likely to be rendered unfit. Already there are vineyardists, who, believing in the possibilities of marketing as Spain does, are about to graft portions of their Tokay vineyards to tough-skinned varieties, such as the Hunisa and Olivette Blanche. The former grape is of dark color like the Emperor, and the latter is a large, oval shaped white grape. Both are said to be good shippers either in corkdust or sawdust, and the layman should understand that the grape that will stand this method of preserving can be marketed through all the winter months.

Improved Methods of Packing.

Another year may bring about some radical changes in the method of packing these table grapes before they are forwarded from this state. One authority indicates to us that much may be accomplished towards the preservation of the grapes for several months by the use of alcohol fumes, the idea being to first place the grapes in a room, or airtight box, and then allow a certain quantity of alcohol to evaporate within the room, or box.

Another concern much interested in this method of marketing is going to suggest a lighter package, or drum, so that some freight may be saved. It is claimed that if a paper drum were used and made airtight, but durable, less sawdust would have to be used, and we would be able to put six pounds more of grapes in the same package. All of these things will be worked out another year.

It is estimated by the best informed eastern importers of Spanish grapes that if disease had not attacked the Almerias this year, there would have been exported to this country 1,000,000 barrels of these table grapes. As it was, we received over 500,000 barrels to November 20, 1914, or more than ordinarily would have come to that date if conditions of peace had prevailed in Europe. The war naturally diverted table grape shipments here that would have gone to Havre and Liverpool, so we received much more than our normal share.

It would be well to explain that the gross weight of a keg of Spanish table grapes is from 60 to 75 pounds, the net contents being about 40 pounds. These grapes are similar in appearance to our California Malagas, and the selling price in New York takes the wide range of from $2.50 to $6 per keg.

RAISIN GRAPES.

The raisin branch of the industry was never in better condition than during the last three years. The California Associated Raisin Company, with headquarters in Fresno, has proven an active and successful marketing organization that has brought profit to those who entrusted their production to this cooperative corporation. The production in California in 1914 was 90,000 tons, or 180,000,000 pounds, and the market value of the crop is over $7,500,000. By varieties, the crop of 1914 was as follows:

Muscat	60,000 tons
Thompson's Seedless	18,000 tons
Sultana	9,000 tons
Malaga, Feher Szagos and other varieties	3,000 tons
Total	90,000 tons

This production exceeded the 1913 crop by 40 per cent.

The selling price today is about as follows:

Muscat raisins	4 cents per pound
Thompson's Seedless	$4\frac{3}{4}$ cents per pound
Sultanas	$4\frac{1}{4}$ cents per pound

About half of this quantity of raisins has been sold, and it is not absolutely certain that these prices can be realized for the whole crop, but there is every indication that the figures will not change for the worse. It should be understood that the selling price is net to the grower, less the cost of administration of the marketing organization.

The money brought into the state for the raisins including the packing and all other charges in connection therewith, would amount to 25 per cent more. The net selling return to the grower is not by any means net profit, for there is much expense attached to the production of raisins ready for market. The fresh grape dries to the raisin state at the ratio of 3 6/10 pounds to 1 pound; and after deducting all expense, such as harvesting, drying, tillage, interest, taxes and selling expense, the net profit to the growers of raisins the past year would be about $1,500,000.

A large additional tonnage is realized from the raisin grape vines in the way of culls and second crop grapes, and these were sold to the wineries in the district at prices ranging from $6 to $9 per ton. Muscats brought as much as $14 per ton at some of the wineries.

WINE GRAPES AND WINES.

The wineries of the state and the wine grape growers have had a great deal to contend with during the past year. The prohibition question in California threatened and depressed conditions during the whole of 1914 until the election demonstrated that prohibition was not wanted in this state. Federal regulations affecting wine have become operative since October 23, 1914, and California wines are now costing the consumers 8 cents more per gallon than heretofore. The tax of 8 cents per gallon does not affect business operations between the manufacturers and dealers, but applies to the wine when it is in the hands of retailers who sell to consumers. In other words, the 8 cent tax is presumed to be paid by the consumer.

It is the other federal tax of 55 cents per proof gallon on grape brandy used by wineries in the fortification of sweet wines that will in a measure revolutionize the production of fortified wines in the state another year. It does not affect table wines such as Claret, Riesling, Sauterne, Burgundy or any of the varieties known as dry wines. It applies to Port, Sherry, Malaga, Angelica, Tokay, Madeira and other types of sweet wines that require the addition of grape brandy to preserve a certain and varied sugar content.

The Fortifying Tax on Brandy.

What the result of the imposition of this heavy tax will be another season is problematical. The National Government required money to make up revenue deficiencies, and one of the number of ways proposed by Congress was to raise the tax on brandy used in fortifying sweet wines from 3 cents to 55 cents per proof gallon. The decision affected California sweet wine districts tremendously—more so than all other parts of the United States combined. The regulation became operative October 23, 1914, but the manufacture of sweet wines in 1914 had been

largely completed before that time and there was little to do in that direction after the tax became operative. We estimate that 90 per cent of the wine was fortified before the tax went into effect, so the regulation had little or no influence on the winery prices for grapes in most sections. A different story may be told another season, however, although it is premature at this time to suggest what the situation may be.

We are not thinking particularly of sweet wine districts and sweet wine makers, but of the entire wine industry, because the dry wine sections, as well as the table and raisin grape growers, may feel the result by reason of the community of interest between all of the branches of the grape growing industry. If sweet wine wineries can not afford to manufacture half as much port or sherry because of excessive investment in tax money, the grapes ordinarily used for sweet wine will be used in the production of dry wine and create a great overproduction of this article to the detriment of producers in well recognized dry wine sections.

Again, if fortifying is done to a very limited extent, the table grape people and the raisin producers will find no market for their culls and second crop grapes, and these particular grapes were handled last year by the wineries to the extent of perhaps 150,000 tons, netting the table and raisin grape people $1,250,000.

What Another Season May Bring Forth.

An optimistic view to the grower may be presented by the wine makers who are naturally studying the best methods of operating next season under the heavy fortifying tax. We know that sweet wine wineries can not operate another season in the same manner as heretofore. The application of the tax, if the same plan of manufacture is pursued, would raise the immediate cost of fortified wine to such a figure that none of the sweet wine establishments in the state could handle the revenue feature in addition to the normal cost of the grapes and the cost of manufacture. It may be that sweet wines will be manufactured and fortified with very little sugar in them. A lessening of the sugar content in fermentation will produce greater alcohol and thus enable the manufacturer to add half as much 55 cent brandy as he would ordinarily. Then after the wine had been fortified with its very low percentage of sugar and taken into storage in the cellars, the sugar could be brought up to normal or thereabouts by the addition of condensed must.

Another method that might be employed would be to ferment sweet wine grapes as usual and stop the fermentation without fortifying at all. The distillation of the brandy spirits could go on as usual and these spirits could be placed in the bonded warehouses to be used later

on from time to time whenever the wine maker saw fit. As he withdrew the brandy from bond he would pay the tax of 55 cents and fortify his sweet wine. His investment, therefore, in tax money, would be gradual, and he might be able to carry on his business in that way. The whole effect, however, would be by way of deterioration in the quality of California sweet wines, and this is why we say the outlook in the sweet wine districts appears at this time not to be encouraging. The layman may better understand by an example what the new sweet wine tax means by way of investment to the wine maker. Under the old tax, a small sweet wine maker who would produce 200,000 gallons of assorted sweet wines would have paid the government, say, $1,500 for the brandy used in the fortification. Under the present regulation the government tax would cost the same manufacturer nearly $27,500 instead of $1,500. In the same proportion, the tax would apply to the very large producers of sweet wines and would probably cripple them alike.

Total Production of Wine, Brandy and Grape Juice.

The sweet wine produced, by varieties, for the year 1914, is as follows:

Port	9,201,608.89 gallons
Sherry	4,823,690.57 gallons
Muscat	1,087,129.51 gallons
Angelica	1,300,065.97 gallons
Madeira	81,636.56 gallons
Tokay	50,262.41 gallons
Malaga	75,818.60 gallons
Total	16,620,212.51 gallons

The dry wine production cannot well be secured with absolute accuracy, but we feel certain in saying that it will exceed 22,000,000 gallons.

It will thus be seen that the total production of wine in California for the year 1914 was slightly under 40,000,000 gallons, and was very close to the production figure of 1913.

The California brandy produced and deposited in the government bonded warehouses during 1914 amounted to 3,320,744.3 gallons. This gallonage does not mean the total of all brandy distilled. It is the amount presumed to be deposited for commercial purposes, and does not include the amount required and already used in the fortification of sweet wines in 1914.

Very little unfermented grape juice was made during the past year. We estimated that 100,000 gallons was made in 1913, and we do not believe that over 50,000 gallons were made in 1914.

Summary Paragraphs on the 1914 Grape Crop.

In the manufacture of the sweet wines of the state in 1914, 207,500 tons of grapes were used as against 212,937 tons in 1913. There were half a million less gallons of sweet wine made than in 1913. Prices paid to the growers ranged from $6 a ton for culls to $14 for prime varieties.

In the making of the 1914 dry wines, 157,000 tons of grapes were used as against 180,000 tons in 1913. The dry wine production was about 3,000,000 gallons less than in 1913. The prices paid for grapes by the dry wine wineries ranged from $10 per ton to $18, according to districts. In some localities for choice varieties as high as $25 per ton was paid. Short crops, particularly in Napa and Sonoma counties, accounted for the decreased production.

In the production of brandy for commercial purposes 110,690 tons of grapes were consumed as against 51,475 tons in 1913. These brandy grapes cost the wineries on an average $10 per ton. The commercial brandy production was over twice the production in 1913.

The total tonnage handled, therefore, by the wineries of the state was 475,190 tons, and the total estimated price paid for these grapes was $5,250,000.

The deduction to be drawn from this data, figuring that it costs the producer on an average $7.50 per ton to deliver grapes to the winery, is that there was a net profit of $1,685,000 to the wine grape growers of the state.

There were 125,000 tons of table grapes sold by California growers; 324,000 tons of fresh grapes dried into raisins, and 475,190 tons delivered to the wineries, making a total of 924,190 tons of grapes produced in California in the year 1914.

Information Bureau at the Exposition.

During the Panama-Pacific International Exposition, the State Board of Viticultural Commissioners will maintain at the exhibit of the California Viticultural Exhibit Association in the Food Products Palace an information booth in charge of competent help. Here literature and data pertaining to all phases of viticulture in California will be distributed to all inquirers. We expect that thousands of people will call in search of reliable directions pertaining to the vineyard business, and our aim will be to supply only the most authentic information. We propose to tell what has been accomplished in California, what the possibilities are and where the most adaptable soils may be found.

INTERNATIONAL VITICULTURAL CONGRESS.

We beg to call the attention of the vineyardists of the state to the most important convention that will ever have been held in California. It is the International Viticultural Congress, which will meet in Convention Hall, at the Panama-Pacific International Exposition, in San Francisco, on the dates of July 12th and 13th, this year.

Plans are now under way, and the entire program is being arranged. Men prominent in viticultural work all over the world will be present, and high class addresses will be given on these dates by specialists in their line of vineyard work and research.

A special train will leave New York about July 5th, and will come direct to San Francisco. Its passengers will be limited to delegates to the International Viticultural Congress, and they will be accompanied in many instances by their families.

Your California State Viticultural Commission will be prominent in perfecting the details of the program, and a cordial invitation is extended to all the vineyardists of this state to be present at the Congress on the dates above mentioned. There will be morning and afternoon sessions on each day, and the information that will be imparted by the speakers in the addresses given ought to be invaluable to all of us. It will be worth your while to set aside these dates for a visit to the Fair.

A program of entertainment is also being arranged for the visiting delegates after the business sessions are over, and an attempt will be made to show the visitors in a limited way what viticulture means to California.

The sessions of the Congress will be open to the general public and no admission fee will be charged.

Respectfully submitted,

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. WETMORE, President.

E. M. SHEEHAN, Secretary.

STATE BOARD OF

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BULLETIN No. 5

GRAPE CROP REPORT

BY THE STATE BOARD OF VITICULTURAL COMMISSIONERS

Issued at Sacramento, California, August 25, 1915

For the information of viticulturists throughout California, we publish the following data obtained by our office from vineyard owners in the various sections of the State, relating to grape crop conditions at the present moment:

SUTTER AND YUBA COUNTIES.

Sixty-five per cent of a normal crop of grapes would be a fair estimate. The berries are plump and bunches well formed, but there are not so many as usual on the vines. There is considerable mildew in spots and the crop is noticeably short of last season's yield. A late spring storm caused the mildew wherever sulphuring was not resorted to promptly. Lack of a winery in the section and high freight charges from the vineyards to the nearest wine-manufacturing establishment has operated against the growers of wine grapes in their marketing. The production of raisins in this section is on the increase. New vineyards have been planted and some others are to be grafted to Thompson Seedless grapes.

SACRAMENTO COUNTY.

In the American River section there is slightly in excess of half of a normal crop of table and wine grapes. The vines made a good growth and look healthy but the fruit is not heavy. In the Fair Oaks, Orangevale, Florin, Elk Grove, Franklin and Bruceville sections the same conditions prevail and the estimate is about half a crop. Some mildew is noticed in many places.

YOLO COUNTY.

The grape crop is poor. Mildew is noticed in worse form and extent than for many years. It is thought the crop of wine grapes from the Woodland section will not run over 35 per cent of normal

when the bunches affected by mildew are rejected. Farther north in the Arbuckle and College City sections, the crop is better but not up to normal by any means. If it averages 60 per cent of normal the vineyardists will consider themselves lucky.

SONOMA COUNTY.

The best information is that the crop of wine grapes will not exceed 50 per cent of the normal. Late rains, mildew, phylloxera and a prolonged north wind during the blossom time were the causes of the short crop. This section is the heaviest producer of first-class dry wines in California.

SANTA CLARA COUNTY.

"From 50 to 60 per cent of a normal yield" is the report, confirmed by many growers. In some parts of the county there is not one-third of a crop. The cold rains in the late spring caused a great many varieties to fail to set their fruit. The Zinfandel bunches are small with lots of small berries. It happens that where the vines were pruned very late, the crop is good. Mildew is bad in some sections of the county. Berries generally are small, and coulure, or dropping of the blossoms without the setting of the fruit, has been prevalent. There was excessive vigor of the vines caused by late heavy rains and the foliage developed at the expense of the fruit.

SAN JOAQUIN COUNTY.

In the Lodi and Woodbridge sections, there may be 65 per cent of a table grape crop and slightly over 60 per cent of a wine grape yield. Mildew has badly affected the Woodbridge locality and the crop is very spotted. To the east on the higher lands of different character the shortage which is less in extent is attributed to unfavorable climatic conditions and heavy rains when the grapes were in blossom. Zinfandel and Petite Sirah berries are smaller than usual but sugar is well developed for this particular time and the grapes show no signs of drying, the foliage being heavy. Mildew has affected many of the Tokay vineyards to greater extent than at any time during the last five years, and therefore the percentage of culls may be higher than is at present expected. Fall rains may also increase this percentage. Generally speaking, mildew, lack of irrigation and coulure have affected the crop in this section.

NAPA COUNTY.

This county will produce a fairly good crop of grapes this season. It is estimated that the yield will be from 80 to 85 per cent of normal. This county grows wine varieties exclusively and the white varieties are bearing heavier than the red or dark. The Zinfandel crop is light

owing to coulure which has also affected to some extent the Sauvignon Vert. On the whole, however, Napa County fares well in the extent of her grape crop.

ALAMEDA COUNTY.

In the Livermore section the opinion is ventured that the crop will not exceed 30 per cent of normal. The white varieties with a few exceptions show a fairly good yield but the dark varieties are in bad condition. The foliage is excellent but the grapes are to the contrary. The bunches are irregular in the size of the berries. Climatic conditions, such as late rains and a cold spring, are blamed for a short crop.

CONTRA COSTA COUNTY.

The crop of wine grapes is about 75 per cent of last season. The Zinfandel crop is very short, due to cool weather as blooming time and failure of the grapes to set well. The bunches are loose and stringy. Carignanes are doing well but there is some damage from mildew. The Tokay crop is light and many of these vineyards have more or less mildew. All vines have made a splendid growth and should be in shape for a good crop in 1916.

FRESNO COUNTY.

It is said by many that in the last twenty years the vineyards in the San Joaquin Valley have never looked better than this year. If weather conditions the balance of the season are favorable the raisin crop will be considerably more than the average, especially the Muscat variety. Thompson Seedless and Sultanas will not exceed last year's production to any great extent. The raisin interests are fearful lest the growers may not exercise necessary care in the selection of the pack. A big percentage of the raisin-grape crop always goes to the wineries, but this year the sweet-wine wineries are so pressed by the exorbitant Federal tax that they are not able to handle culls and second-crop grapes because of the tax money involved in their manufacture into brandy for fortification of sweet wine. The tax this year is eighteen times greater than it has ever been and the failure of the wineries to handle the culls will necessarily prompt the grower to dry grapes that are not fit for the market as standard raisins. To pursue this practice might demoralize the raisin market and growers and packers should be cautious. It would be preferable to submit to entire loss of the second-crop grapes and culls than to spoil a season's pack by using a percentage of inferior fruit. The same advice would apply to the shippers of table grapes who are also hampered in the disposition of their second-crop grapes by the Federal tax on fortifying brandy.

Some of the varieties of wine grapes are short by from 25 to 50 per cent, but other varieties show a good crop. The Malaga crop is short

but as a whole the grape production in the San Joaquin Valley in the southern section will be larger than the average. The late and continued rains that came the first four months of the year without excessive hot weather, caused a development above the average in the southern section, while it caused a shortage in the northern districts by the rapid development of mildew and faulty setting of the fruit at blooming time.

From another source in Fresno County the opinion is ventured that the Muscat grape will yield an average crop as will also the Thompsons, Sultanas and possibly Zinfandels. Feher Szagos will yield about 60 per cent, and other wine grapes about 80 per cent of a normal crop. Feher Szagos suffered from climatic conditions during the blooming season and other wine grapes have suffered somewhat from a hot spell in July.

MENDOCINO COUNTY.

The grape crop will be as large as usual owing to the increased acreage that will come into bearing this year. If it were not for this the yield would be about 90 per cent of normal. If it had not been for excessive cold weather in the spring of the year the crop would have exceeded the normal by possibly 25 per cent. The grapes are practically all wine varieties.

EL DORADO AND PLACER COUNTIES.

There will be 80 per cent of a normal wine-grape crop and 70 per cent of a table-grape crop. Mildew has affected many of the vineyards and a number of them have not had proper care. Coulure has also affected the district to some extent and lessened the crop.

MADERA COUNTY.

The crop is fairly good—much better than the districts farther north. The Thompson's will run 80 per cent of the normal crop. Muscats will do better and give 85 per cent of the usual yield. Other varieties, such as the wine grapes, will run shorter. A correct estimate of the wine grape crop would be 75 per cent of a normal yield.

LOS ANGELES AND SAN BERNARDINO COUNTIES.

It was thought for some time that the grape crop would be larger than usual but estimates made at the present time agree that the whole crop will be about 80 per cent of last year. In some sections a severe hail storm in the spring did much damage. The LaManda Park section reports the crop in that vicinity will be an average one of good quality, and where vineyards have had good care they are free from mildew. The vines made an enormous growth of wood somewhat at the expense of fruit and this condition is probably due to the heavy rains of the last two years.

STANISLAUS COUNTY.

Dropping of the bloom before the setting of the fruit will cause the Feher Szagos in this section to be third in point of yield. Malagas are normal, except in spots where considerable mildew has affected them. Zinfandels are nearly normal in yield, with same conditions attaching to them as to Malagas. There is about half a crop of Carignane on account of coulure and mildew. Thompson's are normal, as are the Golden Chasselas. There is three-fourths of a crop of Burgers, and about the same percentage of Tokays, the latter being of poor quality. Coulure damaged about two-thirds of the vines at blooming time, and mildew is spotted throughout the crop.

TULARE AND KINGS COUNTIES.

Reports from this section indicate that there will be a raisin crop 10 per cent better and the wine grape crop 25 per cent better than last year.

This is a sweet wine section as far as wine grapes are concerned, and the marketing outlook is not good. One large wine maker in Tulare County says he is not financed sufficiently to handle the new Federal tax and can not manufacture any more than the grapes that come in from his own vineyard. The Federal tax is eighteen times what it was last year, and every sweet wine section in the State is in the same predicament.

IMPERIAL VALLEY.

The growers of the State may be interested in knowing that the Imperial Valley district is experimenting by way of packing Persian No. 21 grapes in sawdust. From the El Centro Press we quote the following:

> "The shipment by Charles Ballance to Chicago of 20 pounds of Persian No. 21 grapes packed in 20 pounds of redwood sawdust and the sale of the grapes for $15, calls attention anew to a method of handling grapes which has been tried in northern California successfully and which the Press has urged for this valley.
>
> "Being able to hold the markets of the country exclusively for a month, Imperial Valley has great possibilities in the way of table grape production, and the Persian grapes are particularly adapted to this region.
>
> "There has been one discouraging fact, however, in the tendency of grapes picked in midsummer in this climate to decay rapidly. Precooling has been tried with some success, but it now appears that by packing in redwood sawdust and shipping without refrigeration there is complete success.
>
> "Let the fact be once established that grapes can be distributed over the country successfully, and they will produce

millions of wealth annually, for there is practically no limit to the market for grapes in the first half of July."

It is estimated that in all 100 cars of grapes were sent out of the valley to the markets of the United States, and being very early fruit there was practically no competition.

Respectfully,

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. WETMORE,
President.

E. M. SHEEHAN, Secretary.

STATE BOARD OF

VITICULTURAL COMMISSIONERS.

Office: State Capitol Building

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BULLETIN No. 6

THE GRAPE IN CALIFORNIA

REPORT OF THE STATE BOARD OF VITICULTURAL COMMISSIONERS

ISSUED APRIL 5, 1916

Viticultural conditions in California are exceedingly interesting at the time of preparation of this bulletin, and we shall endeavor in this publication to give a correct statement of data and facts as affecting the three branches of the industry—the table grape, the wine grape, and the raisin grape.

For a favorable future outlook for all three branches, much depends on the outcome of work that is being done at the present time to induce the Federal Government to correct unfavorable legislation to the wine grape interests of the State, affecting incidentally both other branches as well, as will be explained farther on in this bulletin.

TABLE GRAPES.

The season of 1915 was a comparatively remunerative one to the table grape shippers of the State. It followed a most depressing season of 1914, during which a great majority of table grape shippers realized no profit. Most of them suffered severe financial losses, and for this reason the revival in 1915 was all the more appreciated.

Climatic conditions have much to do with the success or failure of our table grape industry, and the long dry summer and fall of 1915 made it possible for table grape growers to gather almost 90 per cent of their tonnage and pack it for the markets of the country. There were few culls or second-crop grapes for the wineries to handle, and this was most fortunate, for had the usual early rains come and rendered table grapes unfit for packing and shipping as such, the wineries could not and would not have handled them because of the severe curtailment of the production of sweet wine by reason of the exorbitant Federal tax on fortifying brandy.

Weather Bureau reports have given out the information that the dry spell running into the late autumn of 1915 was the longest the State

has experienced in nearly forty years, and this favorable climatic condition made it possible to pick and pack our grapes for an unusually extended period. While normally 40 per cent of the tonnage of table and raisin grape vineyards has been taken by the wineries, the 1915 season permitted of almost a complete pack—a favorable happening that may not be experienced again for many years.

In point of actual tonnage of grapes on the vines the table grape crop in the State in 1915 was considerably short of normal, and notably in the American River district there was only 50 per cent of a crop. However, the stand of the fruit was better, and the long dry season permitted of picking and packing practically all of the fruit that hung on the vines. This brought up the total tonnage of table grapes in the State to a figure considerably in excess of a normal pack, and the prices realized were good.

There are some growers who will contend that the realization of a gross selling price in the Eastern markets of $1,000 per car does not pay the shipper when all of the expenses are figured against that amount, including commission, freight, refrigeration, packing and hauling charges, containers, loading, harvesting the grapes, care of the vineyard throughout the year, interest on capital invested, depreciation of property, taxes and the time employed in the care of the vineyard by the owner and his family.

Comparatively speaking, however, the season of 1915 was a remunerative one.

TONNAGE.

From the best information gathered from authentic sources throughout the State, there were 9,564 carloads of grapes shipped out of California during 1915. There was a total of 1,000 carloads either consumed in the State or sent out in light express shipments. Out of this total of 10,564 carloads, 500 cars were packed in kegs or drums in redwood sawdust as a preservative.

Of the total shipments out of the State there were 750 carloads of wine grapes sent to the Eastern markets, leaving a balance of 9,314 cars of table grapes produced and packed in the State, chiefly in crated form. A small proportion of this amount was shipped, however, in lug boxes, under refrigeration, to Eastern points by way of experiment.

Estimating that there are 13 tons of crated table grapes in a carload and 8 tons of grapes in a car containing grapes preserved in redwood sawdust, the total tonnage of table grapes produced in the State amounts to 125,082 tons.

VALUE AND EXPENSE.

From statistics which we have gathered from the fruit shipping concerns of the State, we estimate that the selling price of 8,814 cars of table grapes shipped East was $8,814,000.

The selling price of 1,000 cars consumed in the State and sent out in light express shipments was $700,000, making a total selling value of the table grape crop of California for 1915 $9,514,000.

The expense per carload that attaches to the maketing of table grapes after they are in the packing sheds is as follows:

Seven per cent commission on selling price of $1,000	$70 00
Freight, at $1.15 per 100 pounds	299 00
Refrigeration on carload	75 00
Packing and loading expense	230 00
	$674 00

Deduct the marketing expense per carload, $674, from the selling price of $1,000 and we have a margin of $326 per carload containing 930 crates of grapes, or about 35 cents per crate.

To arrive at the actual net profit to the producer there must be deducted from this net selling price of 35 cents per crate the cost of care of the vineyard, consisting of labor in cultivating the soil, irrigating, pruning the vines, suckering, spraying, picking the crop and hauling to the packing shed, together with interest, taxes, and depreciation. A factor influencing for the benefit of the grower the Eastern selling price of our 1915 table grapes was the short crop produced in the Eastern States during last season owing to late frosts in the Concord belts from Michigan to New York which greatly curtailed the production in that section, and the advantage, necessarily, was reaped by the California shippers.

The total shipments in 1914 of grapes in crated form and in drums amounted to 8,773 carloads, and it is estimated that 1,000 carloads were consumed in the State and sent outside in light express shipments. It will thus be seen that the production of table grapes in 1915 exceeded that of 1914 by 41 carloads, a comparatively small increase, yet, owing to the excellent crop, the operation of the Fruit Standardization law as applied to grapes and better marketing facilities on the part of the fruit shipping concerns, the producers generally realized better returns.

Professor A. V. Stubenrauch of the United States Department of Agriculture, in an able paper read at the International Congress of Viticulture in San Francisco last year, well says that the table grape industry of California, like all the fruit industries of the State, is dependent upon a wide distribution of the product for a profitable sale of the crop. The volume of production has long ago passed the point

where any large proportion of the crop can be consumed in the markets of the State or in the neighboring states. The plantings are confined to the vinifera or European types of grapes, mostly of the Flame Tokay, Malaga, Cornichon, and Red Emperor varieties. California has a monopoly of the production of this class of fruit in the United States. The problems of transporting the crops to markets are, therefore, problems of wide distribution and the factors which underlie the successful shipment of the fruit are of the most urgent importance to the growers. When all the present acreage reaches full bearing and new plantings augment the volume or tonnage we may expect always, and during a season of ordinary length, a normal yield of 10,000 carloads and this bulk must be handled within a period of six weeks or two months. The importance of finding available markets for these large crops becomes more pressing as production increases and it becomes necessary to extend the area over which fruit may be distributed and to lengthen the marketing season as far as possible by preserving and cold storage methods.

In a foregoing paragraph we have shown that the grower realized 35 cents for a packed crate of table grapes in 1915, when the average selling price in the East of a car of 925 crates was $1,000, and after transportation, packing, refrigeration, and selling commission had been deducted. The question that suggests itself is, "What was his net profits," and according to such authorities as Mr. R. D. Stephens, of Mayhews, California, who is extensively engaged in the table grape business and who has been battling for many years in behalf of the growers against the transportation companies and their freight charges, there is no actual profit to the grower even when the average selling price of $1,000 for a carload prevails in the Eastern markets.

Mr. Stephens contends (and the transportation companies have not successfully contradicted the statement publicly made) that without figuring depreciation, it costs a grower $1.02 to land a crate of table grapes in the Eastern market. In recent statements made he says this is a low figure and that others have claimed the costs run to $1.10 per crate. Figuring the lower cost estimate of $1.02 a crate to a car of 925 crates of table grapes, we find a total cost of $943.50 against a selling price of $1,000, and, therefore, only a net profit of $56.50 on a car of grapes sold at a figure generally considered remunerative.

IMPROVEMENT OF THE PACK.

A combination of reasons may account for the comparatively successful season of 1915. In the first place, standardization of the pack which the State Board of Viticultural Commissioners has always worked for and with a degree of marked success even before the standardization laws of the State were enacted, has given the industry stability and

confidence on the part of the consuming public. The fruit distributing agencies of the State are constantly widening their markets, and last year spent $20,000 in advertising in fruit journals throughout the United States the merits of California's table grapes. Financial conditions in the great consuming centers in the East were much easier, and last but not least in point of reasoning, the Eastern handlers of our grapes knew that we had enjoyed a remarkably dry season and that grapes would arrive in good condition. It is a fact that thousands of carloads of grapes were sold to dealers while en route from California, and the old custom of waiting to see how the car looked on arrival was abandoned because the dealers knew the pack must be right, the sugar content standard, the season perfection and the handling prompt. So we may reasonably draw the conclusion that the State is proceeding along proper and sane lines in the matter of the protection of her perishable products for the success and financial welfare of those who till her soil and who are directly dependent upon the industries.

A new statute, known as "The Fruit Standardization Law," became effective last August. This measure is modeled after the plan of standardizing which has been in force since 1909 in several counties in the Sacramento Valley, and if the new law is properly enforced it will be of value to the table grape industry throughout California. Experience has shown that the shipment of immature and diseased grapes has caused great prejudice against our fruits and heavy losses to the trade, and the new act was passed to prevent, if possible, the marketing of all fruits that did not reach a reasonable degree of ripeness and fair packing. The Viticultural Commission realizes the possibilities of improvement in pack and quality under the provisions of the law and has given it unqualified support, although the funds of the office are not sufficient to afford the co-operation the Commission would extend in the enforcement of better packing and quality in the marketing of table grapes. The Viticultural Commission, however, found the means to keep a representative in the field the greater part of last season who conferred with the various inspectors charged with the enforcement of the new act. He also gave some assistance to the prosecution of shippers arrested in Dinuba, Fresno, and other places for sending out consignments of grapes which had been condemned. In every case brought before the minor courts, and the higher courts on appeal, the violators of the measure were convicted and the principles of the statute vindicated.

Our Commission may have had some influence in securing testimony, and certainly assisted in the orderly and efficient inspection of fruit so necessary in raising the standard of California's grapes. The friends of better fruit packing expect a full compliance on the part of shippers next season, as the standardization act has now become a recognized means of enforcing uniformity of pack and quality in table grapes.

CARLOAD COMPARISON.

Were the Commission equipped with a fund to be devoted to the work of standardization and other economic features concerned with profits in viticulture, great assistance could be given in the various problems involved in the security and prosperity of this great industry. Its importance and extent is well indicated in the following comparative statement showing carloads of deciduous fruits of all kinds, excepting apples, shipped out of the State during the years 1914 and 1915:

	1914	1915
Cherries	166	205
Apricots	382	392
Peaches	2,144	1,689
Plums	1,907	2,225
Pears	2,725	2,645
Grapes	8,773	9,564
Miscellaneous	49	58
	16,146	16,778

From the foregoing general and specific information in relation to table grape production in California and the returns therefrom it is evident that the great revenue of about $10,000,000 brought into the State in one season as a result of the marketing of our table grapes has been distributed among the transportation companies and for a tremendous amount of labor employed in cultivating the vineyards, havesting the crop and packing the grapes. It appears that the producer has actually as his own profit a very small part of the selling price realized for the grapes, and the suggestion must necessarily prevail that wider markets and better prices than have been realized must be obtained for the benefit of the owners of these table grape vineyards.

PRESERVING TEST.

Table grape growers will be interested in an experiment made last season by George C. Roeding, of Fresno, in the matter of packing Emperors in rice hulls. The result of the experiment is shown in the following report made by Mr. Roeding to the Viticultural Commission on January 14, 1916:

"I examined the grapes in cold storage at the Consumers Ice Company this afternoon; Mr. Maynard and Mr. Mann, of the United States Department of Agriculture, were with me. The one keg of *Emperors first crop,* packed November 1, 1915, in rice hulls, were not in very satisfactory condition. The grapes themselves were, as a whole, in very good shape, but the rice hulls showed blue mold. I do not regard rice hulls as satisfactory material for packing grapes and under no consideration would recommend them for this purpose.

"The other keg, consisting of *second crop* Emperors, packed November 5, 1915, was in perfect condition. Out of the entire keg there were only two berries that gave any indication of mold. The stems were also in fine shape, in many cases as dry as the day they were packed. This proves that the second crop Emperors may be packed with perfect safety. I am inclined to believe that this keg in second crop would keep for another two weeks or even a month."

WINE GRAPE AND WINE DATA.

SWEET WINE PRODUCTION.

The production of sweet wine in the State fell off enormously, due to the prohibitive tax levied by the Federal Government in its Emergency Revenue Act of October 22, 1914. The sweet wine makers during the vintage of 1915 made little more than one-fifth of a normal production. Four-fifths of the usual amount made each year was sacrificed because of inability of the manufacturer to finance the excessive tax.

The total gallonage made out of the 1915 vintage grapes was 3,882,-953.69 gallons. Of this total, there was produced in Internal Revenue Collector J. J. Scott's district, comprising the northern portion of the State from the Tehachapi up, 2,497,653.30 gallons. In Collector J. P. Carter's district in the southern part of the State there was produced 1,385,300.39 gallons from the 1915 vintage.

Early in the spring of 1915 some fortifying of sweet wine was done in winding up the 1914 season. This amounted to 125,966.81 gallons in the First District, and to 26,319.77 gallons in the Sixth District. The total production of sweet wines out of 1915 grapes in the northern, or First Internal Revenue District of the State, by varieties, was as follows:

Port	1,573,967.34	gallons
Sherry	501,921.00	gallons
Angelica	210,969.22	gallons
Muscat	209,511.48	gallons
Tokay	1,284.26	gallons
Total	2,497,653.30	gallons

In this same district early in the year 1915, and as a result of the 1914 vintage, the manufacture of an additional amount of sweet wine was completed as follows:

Port	54,217.60	gallons
Sherry	58,112.96	gallons
Angelica	5,912.52	gallons
Muscat	7,723.73	gallons
Total	125,966.81	gallons

Adding the figures just written to the gallonage produced out of the 1915 vintage, we record a total production of sweet wine in the First Revenue District in the entire year of 1915 amounting to 2,623,620.11 gallons.

In the southern, or Sixth Revenue District of the State, the production by varieties out of 1915 grapes was as follows:

Port	640,630.94 gallons
Sherry	486,721.70 gallons
Angelica	132,526.50 gallons
Muscat	125,421.25 gallons
Total	1,385,300.39 gallons

In this same district early in the year 1915, and as a result of the 1914 vintage, the manufacture of 26,319.77 gallons of sherry was completed, thus bringing up the total production of the Sixth District for the entire year of 1915, to 1,411,620.16 gallons of sweet wine.

Adding the total production of sweet wine in each district we arrive at the total output of sweet wine in the State for the year 1915. The aggregate is 4,035,240.27 gallons.

The sweet wine produced in 1914 amounted to 16,620,212.51 gallons, so the production in 1915 was only about 24 per cent of the 1914 production, and only 20 per cent of a normal production.

BRANDY PRODUCTION.

The amount of brandy produced and placed in bonded warehouses in 1915 in the First Revenue District was 2,472,816.2 taxable gallons.

The Sixth Revenue District received in its warehouses during 1915, 140,470 taxable gallons of brandy; so the entire production of brandy in the State in 1915 was 2,613,286.2 gallons.

DRY WINE PRODUCTION.

Data on the dry wine production is not easily available, as no official report is required of dry wine makers, and the information is gathered with difficulty.

Our estimate for the 1915 production, after careful investigation, and segregated by sections, is as follows:

Alameda County and bay cities, including wine made in cellars of foreigners in San Francisco	3,048,000 gallons
Napa County	4,708,000 gallons
Contra Costa County	870,000 gallons
Mendocino County	372,000 gallons
Sonoma County	7,493,000 gallons
Santa Clara County	2,591,000 gallons
Santa Cruz County	47,000 gallons
Sacramento County	590,000 gallons
Lodi section	1,500,000 gallons
Fresno section	250,000 gallons
Southern California	2,250,000 gallons
Various other localities	650,000 gallons
Total	21,571,000 gallons

This total of dry wine production is somewhat short of the normal, which is in the neighborhood of 25,000,000 gallons.

The market selling price of all the sweet wines made in the State in 1915 is about $1.800,000. This is a dropping off in normal value of sweet wine production of about $4,000,000, and as stated heretofore, the shortage was occasioned by the operation of the Federal Emergency Act, taxing sweet wines in manufacture at an exorbitant figure.

The market selling price of all the dry wines made in the State in 1915 is about $4,000,000, a figure somewhere near the normal value of the dry wine produced in the State annually.

After mentioning the dry and sweet wines in quantity and in value, as per the foregoing paragraphs, we should refer to a new class of sweet wines made in the State in 1915, by fermenting methods that did not require fortification, or, at least, have not yet been fortified. These sweet wines are now about four per cent below normal in alcoholic strength, and from two to three per cent below standard in saccharine strength.

The total gallonage of such sweet wines is difficult to ascertain, and we can only approximate the aggregate at 6,000,000 gallons.

The deduction to be drawn from the production of sweet wine, brandy and dry wine in the State during the year 1915, is that 360,000 tons of grapes were crushed.

We estimate that nearly 100,000 tons of wine grapes, including a small proportion of raisin and table grape culls, were left on the vines for lack of ability to sell to the wineries, due to the Federal tax that was operative in connection with sweet wine making and the fear on the part of the dry wine manufacturers that there would be a surfeit of dry wines produced. As a matter of fact, it is regretted now by many of the wine makers that they did not produce more dry wine,

for the market for both dry and sweet wine is in a healthy condition, and there has been a very considerable exchange and purchase of dry wines among the wineries of the State.

Coming to the grower or producer of wine grapes, we find that there was little or no profit to him unless he made his own wine. In the dry wine sections, where the grower sold to the wineries, he received on an average $14 per ton for his grapes, as against from $20 to $28 per ton under normal conditions. He, therefore, made only a slight profit over cost of production. In the sweet wine districts some $10 contracts, and even higher priced contracts, prevailed, and on these there was some margin of profit to the producer. The current prices, however, ranged from $7 to $9 per ton, and in these instances if the grower played even on his grapes he was fortunate.

At the time of issuance of this bulletin there are healthy indications for the wine grape growers. A reduction of over 50 per cent in the Federal tax seems assured, and there is no oversupply of wine in the State. Already, new contracts are being made in the sweet wine sections covering Muscat grapes for wine purposes, and offers of $12 per ton are prevalant.

GRAPE JUICE.

There was but a very small production of unfermented grape juice in the State due to the carry over from former seasons and the poor demand for the California type of grape juice. We estimate that less than 1,000 tons of grapes in the State were crushed in the manufacture of unfermented grape juice of both the red and white varieties.

RAISINS.

California has a monopoly of the raisin business of the United States, and although the season of 1915 opened with much foreboding by the raisin interests they solved their difficulties tactfully. There is a close community of interest between the raisin grape and wine grape industries, and at the beginning of the season of 1915, because of the hardship imposed on the wine industry by the excessive Federal tax, the raisin people were much concerned over the fact that many tons of wine grapes inferior as raisins would be dried and thrown into the raisin market to the great injury of pack standards and the general demoralization of raisin affairs. In the Fresno section the California Associated Raisin Company bought from 10,000 to 20,000 tons of wine grapes, leased idle wine plants and made these grapes into wine and brandy, paying an average price of $10 a ton to the growers for these wine grapes and becoming, as it were, wine makers as well as marketers of raisins. The desired effect was accomplished, however, and the total

production of raisins in the State is conservatively estimated at 124,000 tons, segregated as follows:

Muscat raisins	93,000 tons
Thompson's Seedless raisins	18,000 tons
Sultana raisins	8,000 tons
Other varieties made from wine grapes	5,000 tons
Total	124,000 tons

This figure of 124,000 tons produced in 1915 is about 35 per cent increase over a normal production in the State. Greater demands have come, however, for California raisins due to the European war, and the raisin people are finding no difficulty this year in marketing a greatly increased crop.

We might mention here that with the exception of very limited quantities produced in Arizona, Utah and New Mexico, all of the raisins grown in the United States are of California production.

The market value of California's crop of 248,000,000 pounds of raisins will exceed $10,000,000, and after all expenses are deducted, it may be conservatively stated that the net profit to the raisin producers of the State aggregated $2,000,000. Organization as perfect as it can possibly be made, has produced this success, and although there are some growers in the State marketing as individuals, the great bulk of the crop is controlled through a central board of directors for the benefit of nearly 90 per cent of the entire production of the State.

FEDERAL LEGISLATION.

Grape growers of the State generally are aware of the efforts that have been made in Washington, D. C., since last November in the matter of inducing Federal legislation for the relief of the viticultural industry from the burdensome tax provisions of the present emergency revenue law.

This tax, as indicated heretofore in this bulletin, has operated to the great detriment of the industry in California, and by its provisions sweet wine before consumption was compelled to undergo a tax of about 22 cents per gallon, while dry wine has been assessed 8 cents per gallon. This tax stood out in contradistinction with former tax conditions where only ¾ of a cent tax applied on each gallon of sweet wine, while there was no tax on dry wine. After arduous labor, in which your State Board of Viticultural Commissioners has taken a prominent part, an understanding has been reached with the Treasury Department of the Federal Government to enact new legislation very shortly which will reduce the tax on sweet wine from 22 cents per gallon to a minimum of 7 cents and a maximum of 10 cents per gallon according to its alcoholic strength; and likewise dry wine from a tax

of 8 cents per gallon to a minimum of 2 cents per gallon and a maximum of 3 cents per gallon according to alcoholic strength. Californians contend that the lower rate of Federal taxation will yield the government greatly increased revenue by permitting of the production of a normal vintage each year. The emergency revenue tax, being very excessive, was destructive of production as shown heretofore in this bulletin. The government appears to realize this and is agreeable to a substantial reduction for that reason.

In connection with the framing of a new wine bill an effort is being made on the part of Ohio and Missouri wine makers to change the definition of wine as last promulgated by the Department of Agriculture in Food Inspection Decision No. 156. The interests in the two states above mentioned wish to be allowed extended privileges in the use of water and foreign sugar in the making of their wines, and at the time of preparation of this bulletin the subject is before the Department of Agriculture and the Ways and Means Committee of the House of Representatives.

It would be presumptive at this time to say what will be the ultimate result, and the Board of Viticultural Commissioners intends later on to issue another and more definite bulletin on this particular subject. In the mean time it is endeavoring to acquaint the various viticultural sections of the State with conditions as they arise from time to time, and the hope is entertained that everything will be satisfactorily arranged before the approach of the next vintage season, so that growers and manufacturers will know how to proceed with the handling of the coming vintage.

VINE ACREAGE.

The great task of compiling a roster of the vineyardists of the entire State is still being pursued. We have found it necessary to send a special representative in the person of Mr. J. W. Jeffrey, ex-horticultural commissioner of the State, into various sections to gather correct data and he is now at work getting the information in the grape districts. The indications are that the total acreage in vines will exceed our estimate of 330,000 acres. There have been extensive plantings of Thompson's Seedless vineyards in Sutter and Yuba counties, and the total of the raisin area will be considerably extended.

VINE CONDITIONS.

Reports received to date from the different viticultural sections of the State indicate practically a normal condition of the vines and prospects for a normal crop of grapes in the State for the 1916 harvest. A slight March frost has touched some of the vines in about

half of the viticultural districts of the State, but there has been no appreciable damage as far as can be estimated at the present time. The new shoots had not advanced far and such as were slightly frosted will probably send out new shoots to overcome the damage. Pruning generally has been prompt and well done, but cultivating has been delayed because of late rains. This fact will not materially affect the coming crop and unless later conditions arise affecting the vines we may be sure of a large crop of all varieties of grapes the coming season.

Respectfully submitted,

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. WETMORE, President.

E. M. SHEEHAN, Secretary.

STATE BOARD OF

VITICULTURAL COMMISSIONERS.

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California's Grape Industry

BULLETIN No. 8

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BULLETIN No. 8

TABLE GRAPE PRODUCTION IN 1916

REPORT OF THE STATE BOARD OF VITICULTURAL COMMISSIONERS

Issued February 15, 1917

TABLE GRAPE PRODUCTION IN 1916.

Table grapes harvested and shipped during the season of 1916 before the rains came during the first week in October brought very remunerative prices and the demand was highly satisfactory. Generally speaking, the grapes were of proper standard in sugar, as well as color, and not until after the early rains came in the state did the markets show any signs of weakness. The wineries of the state bought freely of the culls, because the exorbitant federal fortifying tax had been removed through the efforts of this board, and the normal production of sweet wines in the state was restored. This tax, which was in full operation the previous year, prevented the handling of table grape culls by the wineries almost entirely, and after word came that Congress had reduced this tax from 55 cents a gallon on brandy used in fortification to 10 cents a gallon the wineries immediately sought the culls of the table and raisin grape vineyards and made a normal production of California sweet wines.

The following data relating to the production of table grapes in the state will be of interest:

From a maze of figures gathered from every portion of California we are able to say with reasonable accuracy that there were shipped in 1916 a total of 10,741 cars of grapes to points outside the state. Of this total number the best approximation we can obtain as to classification is as follows:

Table grapes shipped in crated form	9,556 cars
Table grapes shipped in drums and kegs packed in redwood sawdust	350 cars
Wine grapes shipped in refrigerator and box cars	835 cars

The average selling price delivered in the East of a car of Malagas was $1,150; of Tokays, $1,250; of Emperors, $1,225.

The estimated selling price in the East of the aggregate of 10,741 cars of grapes, including wine grapes, is $13,000,000. Freight and refrigeration on the table grapes shipped in crates and in drums is estimated at $3,700,000, leaving a net selling price f.o.b. California of $8,180,000 for table grapes. From this amount there should be deducted the selling commission or brokerage of 7 per cent, and after that the cost of loading, packing, crates, harvesting and expense of conducting the vineyard throughout the year to arrive at the growers' net returns.

The total number of carloads of cherries, apricots, plums, pears, peaches and miscellaneous fruit shipped out of the state during 1916 was 8,169 cars; while the total number of cars of grapes alone shipped out of California was 10,741—an indication that a greater quantity of grapes leave the state annually than all other deciduous fruits combined, excepting apples.

In addition to the above-mentioned exportation of California table grapes, it should be considered that approximately 1,000 carloads are consumed within the state or sent in express shipments in less than carload lots to neighboring states. This would mean an additional production of 1,000 cars to the figures given in the preceding paragraphs.

The wine grapes shipped East netted the shippers f.o.b. their stations in California approximately $188,000.

MARKETERS OF OUR GRAPES MAKE SUGGESTIONS.

Upon the initiative of Viticultural Commissioner Frank T. Swett, who is also a grower and shipper of table grapes, the State Board of Viticultural Commissioners has carried on an investigation of the packing and marketing problems, which will be followed up during the season of 1917.

It was thought by the Viticultural Commission that honest comment and criticism by those who have to sell our table grapes in the markets of this country and Canada would be valuable to all growers in the way of arriving at intelligent standardization regulations that would better the general appearance and quality of our table grape pack. The many letters so far received have been extremely interesting, and the comment in most cases is given without reservation and apparently in an honest endeavor to cooperate with the producers of this state for the betterment of the pack, and, consequently, the realization of more remunerative markets. The people and firms having recommendations to make are business houses which buy and sell our table grapes, and they are in a position to know what the consumer thinks and says better than the shipping firms here in California.

Some of the comments are herewith condensed and given to the public as tersely as possible.

Calgary, Alberta, Canada. Ninety per cent of California table grapes received here last season by this firm were excellent. There was some damage by heavy packing, particularly in the Emperors in crates and in barrels, due to the desire on the part of the shippers to pack heavier than the other fellow. Grapes in drums were bruised and the dampness spread throughout the keg. Weight of contents of crates or drums of grapes should be limited to maximum figure. Does not think that extra cleat used in swelling the weight of crate any advantage. All grapes were received the past season in better condition than for several years, excepting that those that came after the fall rains shrunk heavily, both in kegs and in crates.

Denver, Colorado. Quality of grapes received last season much superior to previous years. They were from the Lodi and Fresno sections and arrived in good condition. Do not think it advisable to ever do away with extra cleats, as they make appearance of crate more attractive and full. Toward the end of the season received three or four cars showing decay and mold on account of rains in California.

Another Denver firm reports that there was much improvement last year, both as regards quality and pack of California table grapes. There were unloaded in Denver 75 cars of table grapes—almost entirely Tokays and Malagas. Tokays from Lodi and Sacramento were lacking in color. Fruit packed in crates with double cleats seemed to arrive in as good condition as if packed without cleats. Use of cleats could be limited. Trade wants heavy-cleated or double-cleated package, for the reason that they get more weight, and packers who put up grapes that way get preference from buyer. All grapes were satisfactory as to ripeness and sugar content. Fruit that came after the rain showed decay and berries fell from the stem. Grapes shipped last season from southern California were not satisfactory, the early Malagas being immature, sour, under size and more or less wasty. Some Muscats and black grapes from southern California hurt this market, because of slack pack and decay.

Pueblo, Colorado. From this city comment comes from one of the leading handlers of our grapes that the table varieties of the 1916 harvest arrived in good condition, and that they experienced no trouble with eighteen cars out of Lodi. Two cars that arrived from the same district after the rain were more or less moldy. This firm believes, however, that in a measure this condition was due to poor loading of these two cars. One of the cars was loaded practically to the roof, leaving a large space in the center of the car which should have been utilized rather than using the space for bracing. As to the weight of

the grapes in a crate, this firm believes that it should be standardized. The extra cleat did not bring a penny more as far as that market is concerned, and the 20-pound crates were sold as well as the 24-pound crates. It is believed, however, that a uniform standard pack of 24 pounds net would be an ideal package. The early grapes contained a sufficient amount of sugar, but the suggestion is given that this condition must always obtain as far as ripeness is concerned, because it is impossible to sell green grapes.

Fort Smith, Arkansas. Grapes arrived in poor condition and had no keeping qualities. Lost big money, and do not want to handle any more California grapes.

Tampa, Florida. This firm's operations last year in California were disastrous from a financial point of view, and they are inclined to give up this branch of the business. They guaranteed to the shippers in California to pay their drafts, no matter what happened to shipments of grapes en route. Will object to this form of handling hereafter. They complain about careless inspection, and in the case of forwarding to Tampa there must be a maximum of care in packing and loading. Cars are often held up at junction points for two days and are also delayed long at railroad terminals. Cars have been roughly handled and loads have been shifted by hard bumping en route. Unless the railroads can improve their service, these people will not handle any more grapes, as they lost seven thousand dollars ($7,000) the past season. Late September grapes arrived in extremely bad condition, and in one instance a loss of 60 per cent was caused by delay. Weight of grapes in a crate should be limited to a maximum figure. In one car 75 crates of Tokays were worthless, and all of these were one particular grower's shipment. In the opinion of this firm, grapes could be loaded in such a manner as would insure their carrying in better condition if the present method of loading were revised. Shippers should place crates of grapes with the cleated ends next the bunkers and so continue to load on up to the doorway of the car. When the load is completed the crates are stacked cleat after cleat one crate on the other. Thus placed head to head from the bunkers to the doorway, the cleated ends of the crates are crossways in the car, and the contents are protected against severe bumps and knocks in switching and handling.

Chicago, Illinois. Shipments of grapes in 1916 were generally in advance of previous seasons and were of satisfactory quality. Toward the end of the season Red Emperor grapes and some Malagas arrived a little soft and showing a percentage of decay that prevented shipping them to the country trade. Weight of a crate of grapes should be limited to a maximum figure. We do not believe a shipper obtains a sufficiently higher price to pay him for using an extra cleat.

Another Chicago firm reports that the general quality of table grapes shipped from California the last two years has shown a great deal of improvement. It was expected that late grapes harvested after the rains in California would not arrive in good condition, and this proved to be so. Such grapes are sold to the cheaper trade for wine purposes. There has been a tendency in the last few years to greatly increase the weight of grapes in a crate, and in many instances this has now gone to an extreme. It is only the question of a little while before shippers will either add another cleat or make the cleat larger, and where the end will be, no one knows. We think there should be a maximum as to the number of pounds which should be permitted to be put into a crate. There is comparatively little green or unripe grapes coming into the Chicago market from central or northern California, but a great deal of fruit in that condition continues to come from the Imperial Valley. This district should be watched carefully next season. Grapes that were harvested and shipped after the September rains did not arrive in good condition at all, but the handlers understood what was the matter.

Another jobber reports that the average receipts of grapes in the Chicago market the past season showed good quality and condition. The grapes that came to this particular firm were mainly from Imperial Valley, but later shipments also came from the Fresno section. These latter arrivals showed some slight decay, due to the effects of rain and not to the effects of heavy packing or crushing. It would be better to have a few grapes crushed, however, by heavy packing than to have them shipped with imperfect or light packing. The use of the extra cleat is suggested, as it tends to make a better appearing package and the grower will average better net results. All shipments showed satisfactory ripeness and good sugar.

Springfield, Illinois. Received one carload last season with crates packed six baskets to the crate and the trade took to them freely—in fact, wanted more when these were gone, but we were not able to get them. Grapes packed in this style can be very often retailed by the basket, but there are few consumers who want to buy a basket when they are packed four to the crate. As a rule, four baskets are more than a family wants at a time. Had more or less trouble with Tokays the past season, but all other varieties were in good condition, with the exception of the Red Emperors packed in sawdust in kegs or drums. This method is all right when the grapes can be used up promptly, but poor success has resulted when we have tried to hold them for holiday trade.

Champaign, Illinois. Grapes received last season were generally in good condition. There was some crushing of the Tokay variety by over-

packing. Late in the season there was considerable trouble from mold and rot of the Red Emperors.

Galesburg, Illinois. Tokay grapes the past season came through in very good shape with the exception of a small percentage toward the latter part of the season. Believe they were picked and shipped too soon after rain. Received a half-car of Emperors packed in drums. Some of them gave excellent satisfaction, while others have been a total loss. Out of 250 kegs there were fully 40 per cent that were in damaged condition. Fifteen or twenty kegs were positively a total loss.

Bloomington, Illinois. Tokays were of better quality and showed a better condition the past season than heretofore. Thinks a maximum weight without the extra cleat would be best. We have often felt that if packers would use a different cover it would be a benefit. Most every shipment we received contained crates badly pilfered from the sides and the top. This is done also while grapes are on sale on the sidewalk, thus spoiling the appearance of those bunches which have been pilfered and also causing shrinkage in weight. Retail dealers object to this considerably.

Burlington, Iowa. Quality and condition of the 1916 table grapes received was very poor. This refers to grapes from the Fresno district, and especially to Red Emperors packed in crates and drums, probably as a result of rain. Believe the net weight of a crate at 24 pounds would meet all requirements. This gives four baskets of six pounds each. The heaviest-packed grapes from the Lodi district seemed to carry and keep best. Handlers realized that the late table grapes had been damaged by rain.

Sioux City, Iowa. Quality of 1916 table grapes was not as good as usual, mostly from lack of color. This was particularly noticeable in the Emperors that were shipped in crates. Their condition was much poorer than usual on account of decay. Some small, or single-cleated crates, brought more money than could be obtained for double-cleated crates, on account of the crushing of the fruit in the latter. Tendency of California packers for several years has been to ship in too flimsy crates. All crates should be heavier than they are and they should not be packed with very much bulge. Some packers are shipping with mosquito netting on the exposed open sides, and it is a good idea by way of preventing the express and freight employees from making a lunch out of the shipments. Sugar content and general ripeness of the grapes were generally good, but there were some green and unripe grapes on the market at Sioux City. The last shipments were very, very poor. Had to stop buying Emperors earlier this season than ever before and the same thing applied with the Tokays. Emperors bought in kegs and drums had no keeping quality, most of them decaying in cold storage in less than three weeks.

Des Moines, Iowa. Compliments the State Board of Viticultural Commissioners of California on progressive methods in endeavoring to improve the table grape business and markets, and states that due to the endeavors of the board big strides forward have been made in this direction. Tokays of the 1916 pack were of reasonably good quality, but Emperors have proven disastrous to every jobber that has touched them. Emperors packed in drums and kegs were of poor keeping quality, and a great deal of damage has been done to the industry in California through lack of discretion on the part of the shippers in packing these grapes. Several jobbers have lost from one thousand to fifteen hundred dollars per car on these drum Emperors. Auction sales in Chicago showed 392 drums of Emperors sold at an average of 15 cents per drum delivered in Chicago. Another car purchased by a Chicago jobber made him a loss of twelve hundred and fifty dollars ($1,250). Every jobber in the country had more or less the same experience, and unless California growers will show a willingness to reimburse jobbers for these excessive losses, the Emperor grape business in California the coming season will suffer a setback such as has never been before known on any particular line of deciduous fruit. All of the shipping companies in California were guilty of poor packing in drums. These marketers believe that it is an error to use double cleats in packing crates of grapes. If the idea of doing so is to put something a little heavier on the market than other shippers give then it will be but a short time when they will all double-cleat the crates and be all again on the same basis. They believe there should be a law to compel all to use the single cleat for the advantage of all concerned. Most of the grapes were in ripe condition and seemed to carry a sufficient percentage of sugar.

Mason City, Iowa. Emperor grapes the past season gave two kinds of trouble, for the quality was poor and the color was not good. Those coming from Dinuba were the poorest of any this firm handled, and the best came from Redbank.

Waterloo, Iowa. Tokay grapes received by this firm the past season were in good condition and satisfactory to the consumers. The double-cleat method of packing crates has our approval and it is an aid in the selling. We think all grape shippers should adopt the double cleat, because buyers are now in doubt as to whether they are going to get single-cleated crates or double cleated. Received two cars of drum Emperors from the south. They were very poor, showing decay, and the juice of the decayed grapes caused the sawdust to adhere to the clusters to such an extent that it was necessary to trim each stem before they were delivered to the retail trade. This season's pack of Emperors in drums proved disastrous.

Indianapolis, Indiana. Most of the grapes received were of excellent quality and in good condition. No damage was noticed from heavy packing. An occasional berry is bound to be crushed, but there was not enough damage to interfere with the selling. Most of the grapes handled by this firm came from the Lodi section, with an occasional car from Fresno and Sanger. We encourage the use of the extra cleat in swelling the weight and appearance. The American people buy with their eyes, and it is much easier to dispose of grapes with extra cleats than it is to sell a crate with the single cleat. All grapes we received were ripe, but not all were sweet, and seemed to lack in sugar content. The color was good, however, and no unripe or green grapes were handled. Grapes received toward the end of the season were in poor condition; the stems were dead and moldy, the rains having caused this. The only people who handle these moldy grapes are the cheap peddlers.

Another Indianapolis firm reports that all table grapes shipped in crates arrived in Indianapolis in much better condition than for several years past.

Fort Wayne, Indiana. Some of the grapes received this year were very inferior to what were usually received, due to early rains in California. We like the double-cleated crates, as they arrive in better shape than the single-cleated crates.

Wichita, Kansas. Our table grapes received during the 1916 season were the best we ever handled. The weight of the contents of a crate should be limited to a maximum figure. There was no danger from heavy packing and no crushing by the covers of the crates. We would not discourage the use of the extra cleat. There were no grapes left on this market.

Topeka, Kansas. We think the California people are putting up their grapes now in fine shape. The double cleat is all right. There was trouble with Malaga grapes that arrived here the latter part of the season, and the same applies to the Tokays after the rains fell in California. There is little satisfaction in handling California grapes after a few rainy days, as the grapes do not hold up well. It would be better to use them in your wineries instead of packing them. It was noticeable, however, that Tokays that were not picked until a week after the rains came through in pretty fair shape. It seems to be the rule that the better colored the Tokays are the better they carry, and, generally speaking, we compliment the California people on putting up their stuff in nice shape. If others in other parts of the country would do as well, there would not be so much trouble in the business.

New Orleans, Louisiana. Our experience here with California grapes the past season showed that there was something the matter with them after the rain had fallen in your state. Some damage was caused by

heavy packing. The wet weather, however, injured the keeping qualities of the late shipments and made an unsatisfactory season as far as the New Orleans markets were concerned. It was not as much the fault of the packing as it was moisture and decay in the late shipments.

Another New Orleans firm writes that the quality of California grapes, especially Malagas, was poor the past season. It was a rare occurrence to see a crate of Malagas reach New Orleans in strictly sound condition. The Tokays were better, but in the majority of cases they also showed decay. This applies also to the Emperors, but the handlers of grapes knew that the rains in the latter part of the season had affected them. There was no damage from heavy packing, and slack packed grapes were in worse condition than those heavily packed. The use of the extra cleat should be encouraged, as it adds to the appearance of the crate and makes it bring a much better price. The stock generally did not have the usual keeping quality.

Kansas City, Missouri. The quality and condition of the table grapes from California were vastly improved until the latter part of the harvest when the rains did damage. This was especially noticeable with the Malagas. A few hours after they were out of the refrigerator cars they quickly deteriorated and became undesirable. Heavy packing may have had something to do with this. Extra cleats are preferable, but the white varieties should not be packed as heavily, as they have not the carrying or keeping quality. We believe that one standard of weight and packing on each variety should be adopted. Some shippers pack with single cleats and undersell those who pack with double cleats, but the tendency of the majority is to use the double cleat. It would be better if a standard for all were adopted, whether it were single-cleated crates or double-cleated crates. Your California Viticultural Commission is responsible for a vast improvement in the table-grape industry in the state. The high standards that you are sustaining have resulted in a more uniform product to the jobbers. The grapes are generally well matured and the purchasers and consumers are favorably impressed.

After excessive rains in California great care should be taken not to send to the Eastern markets grapes that are suspected of not carrying well. This should be done at your source in California and it would prevent undue waste and put a continued market in a healthier condition.

Joplin, Missouri. Many California table grapes that came under our observation in this market were overripe and there was some damage by heavy packing. The weight contents should be limited and the extra cleat should not be encouraged. The lids of the crates seem to be of too light material; if they were heavier it would save a lot of damage in the shifting of the crates in cars when they are roughly

handled. Generally speaking, we were well pleased with the condition of the California table grapes.

Duluth, Minnesota. Quite a lot of table grapes that came into this market the past season was unsatisfactory. We will be glad to have the Viticultural Commission write us the beginning of the next shipping season, so that we can make daily observations of the condition of the grapes and report intelligently after the season is over.

Minneapolis, Minnesota. Quality of California table grapes the past year was fairly good, with the exception of some development of mildew toward the end of the season. This was noticeable in grapes from the Lodi district. It would be advisable to standardize the crate and get rid of the heavy packages. Uniformity in all its phases is the most practical solution of this difficulty. We suggest that a standard of honor be in some manner adopted by California shippers, as experience has led us to believe that there are many packers not thoroughly familiar with strict business integrity. One shipper sold us a few cars of grapes and repudiated the contract because he could get a higher price when he was ready to ship his grapes.

Grand Island, Nebraska. Quality of 1916 shipments of table grapes was inferior to what it has been. There was great damage by too heavy packing and crushing of covers. The varieties so affected were the Tokays and Emperors. All should come under uniform weight and packing and there should be no extra cleat or swelling of the weight allowed. Sugar standard was below average of former years, and the Emperors arrived in bad condition on account of the rain.

Another Grand Island firm says the 1916 table grapes were on the whole a poor lot. We had heavy losses on cars of Tokays which reached this market during the latter part of August and September. This, we understand, was occasioned by excessive rain in California. We do not consider that there was any damage from heavy packing. The grapes were sweet enough, and this should always be so. We earnestly protest the shipment of unripe grapes, as they are a detriment to us and an imposition on the dealer and consumer. The most important thing in our estimation is to prohibit the shipment of immature grapes and also overripe grapes.

Boston, Massachusetts. Results are better on growers' packs where cars are sold at auction. Buyers invariably ask that they be given straight cars, which contain the product of not more than two or three growers, as there seems to be more uniformity in cars so loaded. All buyers insist on a heavily packed crate, regardless of grade. This heavy packing is largely a matter of comparison and no one grower or shipper can change it. Any change must come through discussion and agreement between the shippers and growers, or, better still, by some

ruling on the part of state officials that a crate of grapes shall be of certain dimensions and weight. It will then be up to the growers and packers to pack solid, but not so heavy as to allow the fruit to be bruised by the covers. We are opposed to the double cleat and straight cars of the double-cleat pack generally contain 870 crates. This is the pack adopted in the Lodi district. Florin, Folsom, and other districts along the American River generally pack in cars of one cleat a load of 945 packages to the car. In our judgment, this is the proper pack; it is heavy enough and the load rides better than in the larger crates. In regard to immature grapes, we think most growers and shippers now realize that it is unwise to start the season too early with green grapes. They should wait until the fruit is reasonably mature and sweet and the demand will then be continuous from the beginning of the season, instead of showing high prices on the first few cars and then a slump on account of the unsatisfactory quality. The rains in your state did a lot of damage to the grapes the past season. It seems to be impossible to make grapes carry well after a storm of three or four days. Only an exceptional demand for wine grapes enabled us to hold the market where we did during the heavy shipments. These grapes that came in poor condition were turned over for wine-making purposes. The price of wine grapes here is governed largely by the crop of Concord grapes in Ohio, New York and Pennsylvania, and if there is a light crop in those states and prices are ruling high, California growers can safely take chances on getting a fairly good figure out of their table grapes, even if they arrive in the East in unsound condition. On the other hand, if the crop in the East is heavy, California table grape growers ought to sell at their local wineries rather than take chances of shipping poor grapes to the Eastern market.

Worcester, Massachusetts. One of the leading firms here comments that the California grapes received were found very nice and put up in fairly satisfactory condition until the rainy season began. After that grapes were more or less soft and moldy, but everybody understood that this condition was caused by the early rains. The general trade prefers a heavy pack with double cleats. It is advised also that all shippers protect exposed edges of grape crates with netting, so as to eliminate the practice of picking grapes from the edges of the crates. The package thus covered with netting is also more attractive looking.

Springfield, Massachusetts. Our experience was very, very unsatisfactory the past season and we did business at a considerable loss. We will not try to handle any more Emperor grapes packed in drums. This is the second year we have done it, and it will be our last. They seemed to arrive in fairly good condition, but as we bought them for the later trade we did not try to move them promptly, and in two or

three weeks' time we found them half decayed. California people ought to learn a little more about packing Emperor grapes, so that we might be able to keep them a long time after their arrival in our markets. The Almeria grapes of Spain, which arrive here packed in cork dust, will keep until after the holidays, and we do not see why California should not be able to accomplish the same result if her grapes are properly packed. Malaga grapes from Fresno were very fine, with the exception of a car that arrived October 9th. The grapes in that car were in bad condition and did not suit the trade at all.

St. Louis, Missouri. The pack of table grapes handled by us the past season was uniformly good, with the exception of the Emperors, which are your late grapes. They arrived in poor condition. They were the grapes gathered after the early rains in California, and no doubt their keeping qualities were much affected.

Butte, Montana. We fully appreciate the effort the Viticultural Commission is putting forth and the splendid results you are getting from your supervision of the table-grape packs. The quality of the 1916 shipments was very good indeed and showed great improvement in the early shipments. In the latter part of the season they were not so good, and we understood the heavy rains were responsible for that. In some instances the grapes were crushed a little on account of the packing being too heavy. A few crushed grapes will sometimes spoil the appearance of the whole crate, and we believe in the extra cleat, not so much for the purpose of increasing the weight of the crate as for protection in packing. We would favor a standard package, however, whether it be a single-cleated package or one that is double cleated. Some dealers will buy a car with single cleats and cut under the price asked by those who handle the double-cleated crates. By using a standard package, it will eliminate all this controversy and have the tendency to make conditions much easier on the selling end.

Regarding ripeness, the shipments were in splendid condition and seemed to come up to standard in sugar. The late shipments were a little too ripe and a considerable loss was suffered on the last five or six cars we handled. We are willing at all times to give your board every assistance possible to help you in your efforts to give us the very best fruits your state can produce.

Helena, Montana. The packing of your grapes with double cleats does not injure the fruit. The injury comes when you pack your table grapes right after a rain without giving them a chance to dry thoroughly. Shippers are too anxious to get the goods out in a hurry, and for this reason they arrive sometimes in moldy condition, giving great dissatisfaction. A number of cars from Lodi were rejected here on account of arriving moldy, and this injures the reputation of California table grapes. The consumer is the one who experiences the

dissatisfaction and hurts the demand. In order to avoid this, strict regulation must be adopted not to pack any grapes immediately after rainy weather. They should be left on the vines until thoroughly dry. This applies to other varieties as well as Tokays.

Great Falls, Montana. The general quality of the 1916 grapes was good. Most of the grapes we handled were from Lodi. There was little damage to grapes from heavy packing, excepting where baskets were packed too full and the top grapes were crushed by the pressure of the cover. We believe that 24 to 26 pounds is about the correct net weight for crates of table grapes. The Tokays were well colored, as well as sweet and ripe. Late grapes arrived in bad condition and rapidly decayed. The pack of Emperor grapes in sawdust did not have keeping qualities because of your wet weather.

Billings, Montana. The last few cars of grapes we received were a losing proposition. On one car we lost three hundred dollars ($300) because of the poor condition of the grapes. The quality was good in point of sweetness and color and there did not seem to be any damage from heavy packing or loading. The extra cleat is an advantage, as it allows the air to pass through, and in this way the grapes are not apt to heat when piled up in the warehouse.

Lincoln, Nebraska. The early shipments of your table grapes were very good and there was no trouble with green, immature stock. There was no damage from heavy packing. We do not believe the weight of the contents should be limited to any special maximum figure as long as your shippers do not pack any heavier than they are now packing. We think the use of the extra cleat is advisable. The rains in California damaged the late shipments and they arrived here in poor condition, showing mold and decay. Your Emperors, packed this year in sawdust, did not keep nearly so well as they have kept in past years.

Columbus, Ohio. We handled eight to ten cars of California grapes last season, and we found the shipments of ordinary quality, more particularly the Emperors. We realized that your excessively wet weather had something to do with this. The double-cleated crates will bring from 5 to 10 cents more per package at all times than the single-cleated crates.

Portland, Oregon. The quality of the 1916 pack was as good as any average year. We saw very little fruit that showed damage from being packed as heavily as 28 pounds to the crate. Our idea, however, is that a 24-pound crate would be ample, providing it could be made the universal package. The greatest trouble in reducing the weight of the crate would be found in the shippers and jobbers working together and using the small lug boxes. We found no objection to the sugar content of the grapes. Toward the end of the season the quality was very bad.

Besides the rains, we think your late spring frost was instrumental to a great extent in sapping more or less of the nature out of the stalk of the parent vine. We think every jobber throughout the Northwest had a very unsatisfactory grape season in 1916. Very few of us made any money, and those who had any quantity of Emperors in storage for their Thanksgiving or Christmas trade lost heavily.

Philadelphia, Pennsylvania. One of the leading firms reports that the condition and quality of the grapes shipped during the season of 1916 was generally good. There is no questioning the fact that the sugar test, as enforced by California in grape shipments, has been highly beneficial and better prices have been received for early shipments of grapes than when sour and immature fruit was sent to the Eastern markets. They give it as their opinion that it would be better if a uniform package were adopted, say not over 20 pounds of grapes in each crate. While the extra heavy pack is preferred by some dealers, it is not believed that the returns are as great as the additional quantity of fruit placed in a crate warrants, and then the tendency for bad condition on arrival is greater when packed too heavy. The heavy losses incurred the past season by the shippers and buyers in the East of the Emperor variety packed in drums and kegs will no doubt show itself another season by an unwillingness to buy them at any price. It was unfair for the California shippers to pack them after the rains, when they had every reason to know they would not carry, and the Eastern dealers would not for a moment have considered a purchase of them outright had they known or suspected that the grapes were packed after the rain. Emperors in drums were a total loss to the purchasers, and the brokers in California certainly put it over on the trade by packing the fruit after the rains.

Pittsburgh, Pennsylvania. The condition of California grapes we handled the past season previous to your rains was very good. We refer particularly to the grapes from Fresno, Dinuba and Lodi sections. There was some damage from too heavy packing, and this was caused principally by the covers. All of your packages ought to be uniform in weight. The double-cleated crates are more liable to arrive in damaged condition than the crates with the single cleats. There were quite a number of grapes that arrived early in the season from Imperial Valley that were immature. We feel satisfied that your board has done a great deal of good for the grape industry, and there is still opportunity to further improve conditions by keeping in close touch with the packer and getting him to conform to state rules along the lines of standardization.

Deadwood, South Dakota. Our opinion is that climatic conditions are a large factor in governing the quality of the fruit when it arrives

at destination. California has the reputation of using every effort to put her fruit in attractive packages. The only disagreeable feature we experience with California grape packages is the annoyance caused by grapes being picked off the sides of the crates and the crates sometimes look very unattractive on account of this practice. If some method could be used whereby the grapes would not show at the top and the sides of the crate we believe it would encourage the retailer to handle more of your grapes.

Memphis, Tennessee. The first Tokays of the season from California were about the best we have handled for years, and these grapes came from the Woodbridge section. Toward the end of the season Emperor grapes were in bad condition and every crate we examined showed decay. This was due to either frost or rain. The double cleat is the most satisfactory, as we find the single-cleated crates cause more crushing of the fruit. We think a minimum weight of 30 pounds would be satisfactory and that it would be to the advantage of the grower to discontinue altogether packing in single-cleated crates. A few cars that were received were not fully ripe, and this seemed to originate from the Lodi district, in the early part of the season.

Waco, Texas. The quality and condition of the 1916 table grapes received by us were exceptionally fine, indicating that more than usual care had been exercised in gathering and packing. The last two cars we received, which were shipped to us after your rain in California, did not show up in as good condition. There were signs of mildew and mold, which necessitated handling the consignment quickly. During the past season we handled only Tokays, Black Prince and Verdals, with a few Muscats. The quality of the Muscats was not altogether satisfactory, the acid being extreme. The question of limiting the number of pounds of grapes in a crate is not of so much importance as that of regulating the shipment of crates of grapes insufficiently filled. No doubt the early rains in California had a great deal to do with the poor quality of the late shipments.

San Antonio, Texas. We handled 40 cars of California table grapes during the 1916 season and they were not up to standard in quality, as they have been in former years. This comment pertains more to the size of the berries. They were a little smaller than usual, and these undersized grapes seemed to come out of the Lodi, Fresno and Newcastle districts. From the Etiwanda section the berries were very fine and large. The heavy packing is preferable and our trade prefers the extra cleat. In regard to ripeness, there was an improvement over former years and we noticed no unripe grapes in our market. The Emperors which were shipped after your rain showed mold, and growers should never make the mistake of trying to pack wet grapes.

Salt Lake City, Utah. We want to congratulate the State Board of Viticultural Commissioners of California upon the close watch it keeps on table grape shipments. In former years California grapes came into our market before they were ripe. They would look all right, but our customers would send them back on account of their being very sour. This caused skepticism and later cars that came on, and which were in good condition, did not find a ready market, because the consumers were afraid of them after they had already had a taste of early sour grapes. This condition seems to have been overcome and the grapes from California were very good this year until after the fall rain. There were thousands of crates of grapes stored in Salt Lake City, and we have seen tons of them hauled out because they were spoiled. We now have three cars in storage and we are sure we will lose two-thirds of them. Look out for the pack—it is very important.

Seattle, Washington. Our market was in very good condition here until the late shipments of grapes, when we commenced to make some heavy losses on account of the poor quality. This market demands heavy packing and the double cleat, and the shipper who packs in this way will get the preference. Some of the early grapes had poor color, such as the Tokays and Muscats, and there were very few black grapes shipped to Seattle. The second crop Tokays were in all instances in poor condition and the dealers who purchased them sustained losses. This refers particularly to the Tokays from the Lodi district.

Another Seattle firm says its experience with the 1916 table grapes leads us to the opinion that they were of poor quality, especially the white varieties. There was a lot of money lost on Malaga grapes in Seattle because they did not appear to have keeping qualities. The only grapes that seemed to be affected by the style of packing were the Ladyfingers, which were made very tender by the pressure of the covers. It caused the grapes to show brown and unattractive. We would not discourage the use of the extra cleat, but if the general opinion is that the grapes are packed too heavy, the crate might be narrower. It is more convenient to open for inspection a double-cleated crate, and 90 per cent of the grapes are sold from inspection and general appearance. Bad grapes came after your rains. The Tokays held up better than the Malagas. The Emperors packed in sawdust in drums caused the trade severe losses. The Emperors that are coming out of storage now do not show two pounds of good grapes to the drum.

Spokane, Washington. We believe California grapes of the popular varieties are far superior to any produced, but it seems altered in some manner, as the grapes have been arriving in bad condition. This was caused last year to some extent by your rain and the practice of packing the grapes before they were thoroughly dried. Emperor grapes packed

in sawdust in drums gave lots of trouble. We have had the pleasant experience of holding some of these drum Emperors without trouble until the latter part of November, by keeping them in cold storage, but this year it was impossible. If packers are going to double-cleat the crates it might be well to build the end higher and do away with the cleats. It would be a good idea, too, to place a bit of netting over the top of the grapes, so as to cover the open spaces and prevent pilfering. Grapes are becoming a very popular fruit in this market.

Another Spokane firm reports that they had a most disastrous deal on California grapes last fall. A car of Fresno Emperors in lug boxes had no keeping qualities, and they also lost 75 per cent of a car of Cornichons after they had placed them in cold storage. They also took in two parts of cars of Emperor grapes packed in redwood sawdust and the shrinkage on them was something terrible. There were green grapes on the bunches that seemed to decay first, and when the sawdust gets very damp it throws moisture through the entire drum and the grapes soon mold. "We will hesitate to buy any more drum grapes, if that is the way they are going to act," they say.

Eau Claire, Wisconsin. The 1916 shipments of table grapes from California were very unsatisfactory. The keeping quality was not what it should have been, and we made a loss on nearly every shipment we handled. If your grapes that are packed in drums were smaller bunches, with more sawdust around, they would come out in better shape. A little dampness in the drum affects the whole package and we found many drums that were a total loss, particularly those packed at the end of the season. You ought to work with this form of packing in drums until you get a successful result, for we believe it is possible to do so.

Milwaukee, Wisconsin. The condition of the 1916 shipments of table grapes was not very good, for the reason that the fruit seemed to deteriorate more readily than it did in former seasons. The weight of the contents of a crate of table grapes should be limited, and we believe the extra cleat should be continued. The fruit was perfectly satisfactory in regard to ripeness, but in the selling market many of the Malagas, Tokays, Cornichons, and Emperors were not attractive. We had one car of Emperors in drums and it showed decay sooner than we expected and we had a great deal of trouble. Most of our grapes come from the Fresno section, with the exception of the Tokays, which we handle from Lodi. The entire season was unprofitable to us, because the grapes did not keep well and showed early mold. In our judgment, no grapes should be packed in drums in sawdust during intermittent rains, as it causes no end of trouble in trying to keep a commodity of this kind for one, two or three months, which we are supposed to do.

They arrive apparently in good condition, but before the retailers get through handling them they go bad and there is no end of losses, financially and commercially.

PLANS FOR THE COMING YEAR.

In view of the general comment in these letters affecting our shipments of Emperors in drums and kegs packed in sawdust, this board considers it imperative to do something between now and next harvest season by way of restoring confidence in the markets of the United States for the Emperor grape. If the disposition of the Eastern distributors is to take no more chances with our Emperor grape shipments, it behooves our producers to be unusually careful with the packing this year. Our board has already broached the subject in the Tulare and Fresno sections, where most of the Emperor grapes grow, and it proposes to issue extensive warnings to the producers and packers with the view of preventing the shipping of these grapes unless surface dampness is entirely removed. It has already decided to try the experiment of predrying a few carloads of these grapes before packing them, so as to remove surface moisture and thereby improve the keeping and carrying qualities. It is also proposed to cause the establishment of a weather substation in the Emperor district, so as to be able to advise all growers of moisture conditions, which may mean that the daily harvesting of the Emperor grapes should be confined to certain hours on certain days according to atmospheric humidity readings. Then, again, the experiment will be tried of gathering grapes in the midst of heavy dews and removing the moisture by a predrying process.

Between now and the next harvest season this board will communicate several times with outside handlers of our table grapes, in an endeavor to assure them that every precaution will be taken next season to remove the trouble which was generally complained of last season, so that producers will not suffer by skepticism that seems to prevail at the present time. Meetings will be held in the table grape districts, in an endeavor to ascertain whether or not a standard weight of a crate of table grapes can not be adopted, and to learn the sentiment also among the growers as to whether they would care to adopt the use of netting in covering the baskets of table grapes before the cover is placed on the crate. This subject is now being considered very seriously by the Dinuba table-grape growers, and several enthusiastic meetings have been held during the last two months under the auspices of the State Board of Viticultural Commissioners, which has established a branch office at Dinuba under the direction of Mr. J. W. Jeffrey.

We might here tell of the experimental work that is being done in Fresno and Tulare counties at the present time under direction of this

board, but as the subject is covered quite fully in the report of this commission to the Governor, it may be unnecessary at this time to go over it again. The report above referred to will be mailed out to the grape growers of the state with this bulletin.

RAISIN PRODUCTION.

The best estimate of the raisin production in the state in 1916 is 126,000 tons, divided into the following varieties:

Muscats	83,000 tons
Thompson's Seedless	32,000 tons
Sultanas	7,500 tons
All other varieties of wine grapes, not including Zinfandels	3,500 tons
	126,000 tons

It is not thought, however, that this total tonnage of raisins will be shipped or marketed, because a small percentage of this amount consists of raisins that were damaged by rains, and these damaged raisins may eventually have to go to the wineries for distilling purposes.

Viticultural Commissioner Wylie M. Giffin, who is president of the California Associated Raisin Company, of Fresno, estimates that the average market value f.o.b. Fresno for Thompson's Seedless and Sultanas for the past season is 8¼ cents per pound, and that the average market value of Muscats is 7½ cents per pound. The market value of other varieties would average about 5 cents per pound, and thus the total market value of the raisin crop in California for the season of 1916 would be over $15,000,000. Commissioner Giffin states that after deducting packing the grower would receive about 6½ cents per pound for Thompson's Seedless; 6 cents per pound for Sultanas and an average of 4 cents per pound for all other varieties, which would mean that the growers received for their raisins, after packing and selling expense, nearly $12,000,000. The net returns to the growers would be this figure, less the cost of the care of the vineyards, harvesting the crops, drying them and hauling the raisins to the packing houses.

In regard to the question as to whether or not the continued planting of Thompson's Seedless variety of grapes for raisin purposes is advisable, Mr. James Madison, vice president and manager of the California Associated Raisin Company, gives as his opinion that the planting of this variety for raisin purposes should not continue as it has developed during the past three years, because he believes that when the European war is over that there will be a slump in the market for this variety. His contention is that the conditions in Europe have made it possible to market unusual quantities of Thompson's Seedless raisins in this country, and that when the war is over the Greek currants and the Seedless Smyrna grapes will come to our Atlantic seaboard in

great quantities and that our prices will automatically drop to an alarming extent. He predicts that within the next three years we will produce twice as many Thompson's Seedless raisins as we are producing today, because many thousands of acres of these grapes have been planted within the last four years. He advocates giving this warning at the present time to those who would continue the planting of this variety, and would suggest that this planting be changed to Muscats and Sultanas wherever soil conditions are suitable.

Commissioner Giffin believes that when a commodity is high people go to an extreme in planting, and this may be what is being done now in the planting of the Thompson's Seedless variety. He would not care, however, to advise communities on this point with any definite conjecture, as he believes that a great market can be developed for Thompson's Seedless raisins if the growers keep thoroughly organized and continue their advertising and selling campaign. It may be that markets would increase as fast as production, but if organization and cooperation failed there would undoubtedly be too many raisins.

There are localities and soils suitable for Thompson's Seedless grapes that are not good for Muscats and Sultanas. On the other hand, Muscats and Sultanas may thrive where Thompson's would not do well. It is admitted that no separate variety can succeed independently of the other varieties. When the difference in price becomes very great, the consuming public will swing from one to the other of the raisin varieties, and there must necessarily be a close parity of prices as between the different grades of raisins. Commissioner Giffin believes that the question of whether we can produce too many raisins of all varieties is entirely one of intelligence in connection with marketing, and he advocates the continuation of organization as in the past few years if California would seek to avert overproduction of raisins.

WINE GRAPES AND WINES.

As compared with the 1915 vintage, the season of 1916 witnessed a revival of activity that created a hopeful spirit among the wine-grape vineyardists. The great reduction of the excessive federal tax on brandy used in the fortification of sweet wines had the effect of bringing back to California its normal standards in the matter of wine production, and consequently the consumption by the wineries of a great tonnage of wine grapes at prices more remunerative than for several years.

If the severe frost of May 7, 1916, had not visited California's dry wine sections, the production of dry wines in the state would have shown a remarkable increase over normal. In many sections of Napa

and Sonoma counties first-crop grapes were entirely ruined, and in thousands of acres of vineyards the foliage and canes were entirely stripped from the vines after the visitation of the frost. More than 50 per cent destruction in these two counties was noted, and when the vines came into bearing during the vintage season there was found to be a very light crop of grapes, resembling in character the second crop. This fruit did not give the usual high color to the red wines of Napa and Sonoma counties, and for this reason, as well as because of lack of normal sugar, the high standard of the wines of these two counties was considerably impaired.

Our best estimate of the tonnage of grapes used in wine and brandy making during 1916 is 478,197 tons, and the purchase price paid to vineyardists for these grapes was $7,500,000, or an average of $15 per ton at the vineyards. In the sweet wine districts the prevailing price was $15 per ton for wine grapes; in dry wine districts $22 to $25 per ton, and in the case of table and raisin grape culls $7.50 to $8.50 per ton.

There is no official record of dry wine production, and nothing at present in the way of requirement that compels the producer of dry wine to report his annual production, but from our general knowledge of the situation in the various wine-making sections we make a close calculation when we estimate that 23,000,000 gallons of dry wine were produced in 1916. In the well-recognized dry wine districts the yield was far short of normal; but in the sweet wine sections the manufacture of dry wine was resorted to in greater degree than ever before. It required 153,000 tons of grapes to produce 23,000,000 gallons of dry wines.

SWEET WINE PRODUCTION.

With sweet wine, the production is definitely known, because the making of it is a part of the duty of government officials and a record is kept of every gallon manufactured.

In the First Internal Revenue District of California, which comprises the counties north of the Tehachapi, the production of sweet wine in 1916 by varieties was as follows:

Port	6,687,241	gallons
Sherry	3,903,314	gallons
Angelica	2,307,458	gallons
Muscat	2,133,373	gallons
Malaga	79,999	gallons
Marsala	8,985	gallons
Tokay	31,490	gallons
Madeira	32,718	gallons
Total	15,184,578	gallons

In the Sixth Internal Revenue District, comprising the counties of southern California, the following figures show the production in that section:

Port	1,890,819 gallons
Sherry	1,063,249 gallons
Angelica	706,135 gallons
Muscat	376,512 gallons
Marsala	18,961 gallons
Malaga	22,221 gallons
Total	4,077,897 gallons

The production of sweet wines in the two collection districts of the state make a total of 19,262,475 gallons, and in the manufacture of this amount 240,756 tons of grapes are required.

BRANDY PRODUCTION.

Brandy production presumably for commercial purposes, and not for use in fortification, amounted to 2,786,357 proof gallons in the First Internal Revenue District, and 241,535 proof gallons in the Sixth District, a total of 3,027,892 gallons. It required 84,100 tons of grapes to produce this amount of brandy.

The further explanation should here be made that sweet wines and brandies are still being produced in 1917 out of material on hand in the wineries and not either distilled or fortified. This material means an additional tonnage of grapes of the 1916 harvest chiefly.

It is interesting to explain at this point that the United States government by the terms of the present revenue bill, as adopted by congress September 8, 1916, is concerned in California's 1916 wine and brandy production to the following extent:

$0 04 gallonage tax on dry wines produced	$920,000 00
10 gallonage tax on sweet wines produced	1,926,247 00
10 fortifying tax on sweet wine manufactured	481,562 00
1 10 unbonding tax on commercial brandy produced	3,331,681 00
	$6,659,490 00

REFUND OF FIFTY-FIVE CENT BRANDY TAX.

At the time this bulletin is about to be issued word comes to this office from Washington, D. C., through Congressman William Kent, that a final interpretation of the refund portion of the act of congress approved September 8, 1916, has been reached.

During all the effort that was made in Washington to obtain a reduction of the fortifying tax on brandy used in the making of sweet wine, it was agreed that if the fortifying tax were reduced and a different form of taxation adopted, that there should be a refund of the

fortifying tax to those who had made wine under this excessive fortifying tax and had paid the tax. No one disputed the justice of this action, but after the reduced tax became a law, there was a disposition to question the intent, and up to a few days ago the subject had not been definitely settled. Congressman Kent submitted a brief or letter to the Secretary of the Treasury and on February 8th wired to this office the following message:

"WASHINGTON, D. C., February 8, 1917.

"Brandy tax will be rebated in accordance with request in brief which I sent Department, copy of which will follow. Matter finally determined, as no other interpretation can sensibly be put on the law. Extract of decision follows: 'After a careful examination of the taxing provisions of the act of October twenty-second, nineteen fourteen, with the provisions of the act of September eight, nineteen sixteen, this office has reached the conclusion that the abatement and refunding provisions of the last named act apply not to the tax collectible on the finished wines but to the tax assessed on brandy used in the fortification of such wines. So much of paragraph twenty-three of regulations twenty-eight, Supplement No. 2, holding that the abatement or refund of tax here referred to does not apply to the tax on brandy used in fortifying such wines is hereby revoked. Proof as to the use of the brandy on such abatement or refund claimed and the actual possession of the wines by the producer at the time the act of September eighth, nineteen sixteen, went into effect must however be furnished with each claim filed as in the cases provided for in the regulations here referred to.'

"(Signed) WILLIAM KENT."

Supplementing this information, we have word as this bulletin goes to press to the same effect from the office of the collector of internal revenue in San Francisco. This office interprets the decision to mean that the refund will consist of the entire 55-cent tax and plans will be devised immediately in the collector's office to bring about such rebate. Wine makers in the state who have claims under this decision will be required to furnish under oath conclusive proof of actual possession on September 9, 1916, of wines fortified under the 55-cent tax. Some means of identification of this particular wine will also be required and the whole subject is now up to the several collectors of internal revenue.

By way of information to the general public, we might say that great quantities of aged commercial brandy have been bought at the bonded warehouses during the past six months by agents of Eastern exporting firms. There is comparatively little old brandy in California bonded warehouses at the present time, and it is reported that this

brandy has been purchased for export to Europe. There are many inquiries at the present time for old brandies, but California has little or none to offer.

Respectfully submitted.

STATE BOARD OF VITICULTURAL COMMISSIONERS,
C. J. WETMORE, President.

E. M. SHEEHAN, Secretary.

STATE BOARD OF

VITICULTURAL COMMISSIONERS.

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GRAPE CROP REPORT

BULLETIN No. 9

ISSUED JUNE 30, 1917, BY THE

State Board of Viticultural Commissioners

CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO
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BULLETIN No. 9

BY THE STATE BOARD OF VITICULTURAL COMMISSIONERS

SACRAMENTO, CALIFORNIA, JUNE 30, 1917

For the information of growers, packers, shippers and handlers of California grapes we publish the following data obtained by this board from vineyard owners in the various sections of the state relating to crop conditions at the present moment:

ALAMEDA COUNTY.

On account of a very light rainfall, long spells of frost and cold weather early in the year the vines in the Livermore Valley are about a month behind their normal growth, but are now in fine condition and appear strong and vigorous. The outlook at present is for a 100 per cent crop throughout the county.

COLUSA COUNTY.

There was some frost damage to the vines in April, but the general crop looks good. A 100 per cent crop is looked for around College City and a 90 per cent and 95 per cent of normal in other sections of the county.

CONTRA COSTA COUNTY.

The crop of wine grapes is about 85 per cent of normal.

EL DORADO COUNTY.

From present appearances, the grape crop will be normal.

FRESNO COUNTY.

From all parts of Fresno County reports have been to the effect that vines never looked better, and a 100 per cent crop is looked for all along the line, providing insect pests and climatic conditions allow the grapes to mature.

IMPERIAL COUNTY.

Reports from the Imperial Valley would indicate a normal output. No material change one way or the other from other seasons is observed.

KERN COUNTY.

The grape crop in this county is reported 100 per cent.

KINGS COUNTY.

The frost that occurred in April of this year injured Sultanas and Thompson's Seedless and as a result an 80 per cent of normal crop is looked for. A normal crop of Muscats is estimated.

LOS ANGELES COUNTY.

A report from this section states that on account of the cold spring the vines are about three weeks late, but the indications are that the crop will be normal. Sulphur was not effective on account of the cold weather, and if vineyardists are not careful they may suffer loss through mildew.

MADERA COUNTY.

At the present time the prospects are for a 100 per cent crop of grapes.

MENDOCINO COUNTY.

Our reports from this section state that although the season has been cold and backward the vines look vigorous and are making a good growth. Their general appearance would indicate a 100 per cent crop.

MERCED COUNTY.

So far as can be judged from the care and appearance of vines and blossoms, Merced County will have a 100 per cent crop of grapes. They give as good promise as in past seasons, but the weather conditions threaten more mildew than last year.

NAPA COUNTY.

Our reports from the upper end of the Napa Valley indicate a 65 per cent to 75 per cent crop on the low lands where the vines were so badly injured by frost on May 7, 1916. Last year's canes were small and weak and even after unusual effort on the part of the best growers still present a sorry appearance. Frost visited this section again late this spring, causing slight injury to the vines and there has been some damage from cutworms. On the frostless lands a 100 per cent crop is looked for.

In the lower end of the valley the vines have been backward, the growth apparently retarded or stunted by constitutional weakness

probably induced by last year's frost; otherwise growth appears healthy and buds and bunches sufficiently abundant to produce a 100 per cent crop, ripening late.

PLACER COUNTY.

From the appearance of the vines around Roseville the crop will be 90 per cent of normal. Newcastle reports a 100 per cent crop of grapes—"Best we have seen in many years."

RIVERSIDE COUNTY.

From the western part of Riverside County the grape men report a bumper crop—100 per cent and over. The majority of grapes in this locality are wine grapes. In the Coachella Valley the crop of Thompson's Seedless is about normal and the Malagas 80 per cent to 85 per cent, owing to some injury from late frosts. It is therefore safe to figure from the present prospects a crop in Riverside County somewhat above normal.

SACRAMENTO COUNTY.

Generally speaking, the crop conditions in the vineyards are in splendid shape. In the American River district where the vines were irrigated and cared for after the frost of May, 1916, there is every indication for a normal crop. Where the vines were neglected, the crop will naturally be light.

SAN BERNARDINO COUNTY.

The wine grapes in this section will run 95 per cent to 100 per cent and over from present indications. The prospect for Muscat raisins is about normal and Sultanas about 5 per cent more than in 1916.

SAN DIEGO COUNTY.

Wine, raisin and table grape growers report that while the season has been backward due to a cool spring, every indication at present points to a 100 per cent crop.

SAN JOAQUIN COUNTY.

In the Lodi section, on a basis of 100 per cent as being normal, the Tokay crop is placed at 110 per cent and all other shipping varieties at normal. Missions, Burgers, Zinfandels and other wine varieties are estimated 90 per cent to 100 per cent in different sections of the county. All vineyards at the present time have an unusually healthy growth of foliage and with the attention that is being given in the way of sulphuring, cultivation, etc., a heavy crop is expected.

SAN BENITO COUNTY.

The vineyards in this county are reported as being in excellent condition considering the inferior wood due to last year's frost and the late spring of the present year. A 90 per cent crop is looked for.

SANTA CLARA COUNTY.

Crop now looks to be normal. The vines are vigorous, but signs of mildew on some varieties, especially Carignanes.

SANTA CRUZ COUNTY.

Grapes look normal, or 100 per cent, at present.

SOLANO COUNTY.

One hundred per cent.

SONOMA COUNTY.

Notwithstanding the destructive frosts of last year and the frosts of May 14 and 15 of this year, the vines are thrifty and the bunches are unusually large. Estimates run from 70 per cent to 80 per cent of a normal crop for this year's harvest.

STANISLAUS COUNTY.

A normal crop is expected.

SUTTER COUNTY.

Reports from this section would indicate an 85 per cent crop of Thompson's Seedless, 50 per cent of Alicante Bouschet, 100 per cent Zinfandel and Petite Syrah.

TULARE COUNTY.

At the present time it looks as though Tulare County would have a 120 per cent grape crop. There is an extraordinary crop of blossoms on most of the vines and many acres of new vineyards are coming into bearing.

YUBA COUNTY.

Eighty-five per cent of normal.

YOLO COUNTY.

All varieties look like 100 per cent.

MEETING HELD AT FRESNO JUNE 2, 1917.

An interesting conference with growers, packers and shippers of grapes was held under the auspices of this board in Fresno at the city auditorium on June 2, 1917, and for the benefit of those who were unable to attend we think it advisable to publish a few of the important papers read on that occasion. There were morning and afternoon sessions and the presiding officer was Viticultural Commissioner Frank T. Swett of Martinez. Mr. Louis Gundelfinger of Fresno was selected as secretary of the meeting.

WEATHER INTELLIGENCE, LOCALIZING OBSERVATIONS—DISTRIBUTING INFORMATION.

Paper read by Mr. W. B. Nichols, Dinuba, Cal.

No one questions the value of the Weather Bureau reports at the time of the raisin harvest, and any effort to broaden their scope and make more available their predictions should be encouraged to this end. I believe the various centers in the raisin district should arrange for better and more prompt distribution of the reports as they come from the observer's station.

The present practice is, as I understand, each morning to phone the prediction to the outlying towns where the bulletin is received at some convenient place, such as a drug store or telephone office, and there posted up. In case of sudden change of weather supplemental reports are made and posted in the same manner. These reports are not available to the grower unless he happens to be in town or the recipient has time to phone them out to the neighborhood.

This system can be vastly improved by arranging with the local receiver for the telephoning of these reports as soon as received from Fresno to the various green and dried fruit packing houses in his territory, where they should be posted at the receiving door. In addition to this, one packing house at each receiving point should be provided with a rain flag to be displayed when rain is predicted. In this way the necessary information can be quickly disseminated through the entire raisin belt, and disasters such as that of last season in a measure guarded against.

On account of the wide variation in precipitation and atmospheric moisture even between comparatively near-by points the various centers should be equipped with standard rain guages and wet and dry bulb thermometers. Careful reading should be made and records kept. These readings, if reported to the observer in Fresno, would probably be of service to him in making his local observations.

Knowledge of these moisture conditions will be of particular value to the Emperor grape grower in helping him to guard against picking

damp fruit. It often happens that there is a thorough saturation of the atmosphere without any perceptible precipitation, and this condition will so dampen the fruit and stems as to cause excessive sweating after packing. This was probably one of the causes of loss in drum pack last season. A better knowledge of atmospheric moisture conditions might probably aid the grower in his sulphuring operations.

The cost of obtaining this information will be slight. Nearly every center has a standard rain guage, if not it certainly should provide itself with one. A wet and dry bulb thermometer costs $7.50, rain flags can be secured at slight if any cost. The local observer should have some remuneration, for to be effective the work must be well done and if well done it will require considerable effort on the part of the man in charge. In most cases this remuneration would not be so much a payment for services rendered as a mark of appreciation.

If this expense were distributed among the growers, each paying a fair proportion, it would not be burdensome upon anyone and in no way compare with the benefits to be derived.

This, of all years, is the time when every effort should be made by individuals and organizations for the safeguarding of all food crops. This is one time when self-interest and duty have a common cause and should spur the producers to put forth their best efforts. The world needs the foodstuffs and the producers need the money.

Speaking for my own section, Dinuba, our local observer has used a standard rain guage for many years and has recently ordered a wet and dry bulb thermometer which he will use this season. I have no doubt that he will arrange to cooperate with the government observer in Fresno and that the result will be greater efficiency and better distribution of the information.

REVIEW OF NEW FRUIT STANDARD LAW WITH REFERENCE TO GRAPES.

Paper read by Mr. Fred P. Roullard, Fresno, Cal.

On June 10, 1915, a law was approved to standardize the packing of deciduous fruits and to prevent deception. It became effective August 9, 1915. During the past two years it has been the duty of the writer to act as inspector and enforce the provisions of this act in Fresno County. Many problems arose during the enforcement of this law, some of which were puzzling to packers, growers and inspectors alike. While I do not wish to speak in a disapproving way about the law, for I feel that a tremendous amount of good was obtained by it, I can see after practical experience where those who formed and passed

the law through the legislature overlooked a number of important matters that weakened it.

The new Fruit Standardization Law goes into effect July 26, 1917, the old law is thereby repealed. It covers a number of the weak points already alluded to, is more comprehensive and specific, broader commercially and explains points which heretofore were uncertain as to intent and meaning. I will not undertake a discussion of what may still be considered flaws and weaknesses of the new law. I will simply state that there are a number of improvements that can yet be made, not only in regards to grapes but for other fruit considered in this act. However, today grapes alone are to be considered and clauses pertaining to them discussed.

The first difference between the new and the old law to be noted is that which establishes the same inspection regulations for the packing of fresh fruit for shipments within the state as well as for the interstate shipments. Under the old law grapes sold in bulk, in lug boxes, without special care of packing, were exempt from inspection and determination of the sugar test, and were allowed to be shipped anywhere. Under section 4 of the new law, all grapes must conform to the sugar standard regardless of how they are put up for shipment.

In some counties trouble arose regarding city inspection. The old law was so worded as to imply that city packing houses were not subject to inspection and fruit standardizing, that packing houses outside of incorporated city limits were alone subject to the law. Now a clause of the new law states definitely that the word "county" includes a consolidated "city and county," and the intent and meaning is so expressed that there remains no question as to whether cities are to be included or not.

The sugar test of grapes remains the same as last year with the exception that two varieties of grapes have been added to the 16 per cent list. The law now reads that grapes when packed shall show a sugar content of not less than 17 per cent Balling scale except Emperor, Gros Coleman and Cornichon, which shall show not less than 16 per cent Balling scale.

Crates when packed will be stamped similar to last year. That is each crate or package (not the basket) must have in plain letters the name of the variety or varieties of grapes therein. The baskets or containers shall be stamped in plain figures and letters on one end with the minimum net weight. The weight of the basket must not be below the weight stamped thereon. Actual gross weight must be stamped on all containers that are marked or else come under a class of "irregular,"—meaning that when a container does not conform to the standard it is termed as being irregular and must thus be plainly stamped.

The standard containers for table grapes when packed are:

1. Standard crate, which after packing when measured at the end, shall not exceed 5 inches between the top and bottom when measured in the center shall not exceed 5¾ inches between the top and bottom and containing a minimum net weight of not less than 24 pounds. This clause was included to aid in preventing the overloading of crates. For a time it was thought best that the crate should have a maximum weight of grapes, but experience proved that grapes vary in weight according to the amount of sugar and quality, so that it was impossible to prevent crushed grapes by packing the crates to obtain a definite weight of fruit. The above clause in the new law will probably remedy the trouble of crushed grapes by heavy packing.

2. Double crates must contain a minimum net weight of not less than 48 pounds. However, double crates are seldom used in Fresno County for grape packing.

3. One-half crates must contain a minimum net weight of not less than 12 pounds.

4. Lugs must contain the following weight: 40-pound lugs not less than 32; 50-pound lugs not less than 42; Williams lugs a minimum net weight of not less than 24 pounds.

5. Kegs or drums packed with sawdust or other preserving material shall contain a minimum net weight of not less than 29 pounds and a maximum net weight of not more than 35 pounds.

6. All other containers of table grapes shall be irregular and shall be marked as such.

Section 12 of the new law clears up a matter that has always been a joker to the packers, shippers and inspectors of fruits. The law now reads that labels of crates can be one of three things, first, the name of the vineyard with post-office address, or second, the name of the person or company, and post-office address, who authorized or first packed the grapes, or third, the name under which a packer is engaged in business together with the address of the packer. The clause regarding locality has been eliminated and as a result will be easier to comply with the requirements for labeling.

Under the new law the appointment of inspectors of grapes and the terms of office of these inspectors is determined by the County Board of Supervisors, while under the old law the County Horticultural Commissioner had the appointing power. This change may result disastrously in some counties where the board of supervisors is not in sympathy with the law. But time alone can tell whether this change will be for the good or otherwise.

When there is a dispute between inspectors of two or more counties the State Commissioner of Horticulture acts as a chief inspector and will settle the dispute. This is an addition to the old law.

The salary of inspectors remains the same, that is, $3.50 a day. The new law calls for traveling expenses. This will avoid trouble that has arisen in some counties where traveling expenses have not been allowed inspectors by their respective supervisors.

Under section 18 it is lawful for a common carrier or railroad company to decline to ship fresh fruit found to be packed in violation of the provisions of this act. This will undoubtedly help inspectors to keep condemned fruit at home. Under the old law railroads were required to ship fruit regardless of being condemned.

My plans for conducting the campaign of grape inspection in Fresno County this coming season are about as follows:

Copies of the new law will be placed in the hands of the growers, packers and shippers at the earliest opportunity. Also cards will be printed and placed in all packing houses.

The place for official inspection will be one of three places. At the spider, after the lids have been placed, or in the car where they are being loaded for final shipment.

It has always been my aim to cooperate with the packers in every way possible. I believe if it is possible to carry on inspection where the least amount of trouble can be made for the packer and inspector that an advantage of this opportunity should be taken. I have always felt that I could consider the fruit on the spider as being packed fruit, especially after the floor lady has passed upon it. If inspection is made after the lid is nailed to the crate considerable trouble will sometimes occur in removing lids, etc., while on the spider a pack may be torn to pieces by the inspector and repacked easily by the floor lady or packing girl. Of course, where there is a doubt as to the fruit which has been packed and loaded in the car, there is no other way for the inspector to do but to go into the car, carry out the crates and unlid them. In some respects I believe inspection could be carried on with better results by making official inspections in the car where crates are being loaded for bracing. Not that this would be the easiest place or the most satisfactory to the packer. But if condemnations were made at that point it would place more responsibility upon the packer and cause him to be more careful, if obliged to unload crates that were not up to standard.

Field tests will not be made by inspectors of this department only when the inspector has ample time. While we wish to cooperate with the growers and packers in every way possible, it would be impossible for the small crew of inspectors that we employ every year to do field testing. This point was brought out last season and as a result many shippers, packers and growers of grapes bought grape testing outfits of their own. This is a very encouraging step, and it is the wish of this department that every field agent, packing house and grower have

an outfit and do their own testing. Information regarding methods of testing, outfits, etc., can be had at the office of the Horticultural Commission at any time. It is our wish also that outfits be as uniform as possible.

The mildew question will be carried on as last year. A number of cases of condemnation because of mildew resulted last year on account of poor lighting facilities in packing houses. Hundreds of boxes of grapes are unloaded and tiered up to the roof on one side of the packing house. They are then emptied by the packers and are again tiered up just as high on the other side. As a result the packing hands are working in almost darkness and are unable to tell when bunches are mildewed. Skylights should be placed in all packing houses and packing companies should avoid renting warehouses having poor lighting facilities.

Two modern houses have been erected in the Melvin district, both of which have skylights.

None of us will ever claim that the Fruit Standardization Law is perfect, but in order to get the highest efficiency out of the law there must be hearty cooperation between us; you as packers and growers and we as officials. I do not believe it has been drafted as a drastic measure, but it is compulsory and will be carried out as such. From our experience we are finding the law endorsed both north and south by all the leading shippers of fresh fruits.

ORGANIZING THE TABLE GRAPE TRADE.

By Mr. J. W. Jeffrey, Sacramento, Cal.

When the first successful fight against the protection of California fruits was under way a few years ago, a telegram was received by me from a congressman urging our grape growers to protest against the removal of the tariff duty on Almeria grapes. The telegram urged immediate and united action before it was too late to prevent the threatened reduction. Many others received similar requests, and no doubt were equally at loss as to the best method of securing such action. The legislature being in session at that time, it was presumed that several grape growers and shippers could be found around the Capitol to whom this appeal from Washington could be referred, but no one directly interested in this great industry could be located, and a whole day was lost before a small delegation from Lodi could reach Sacramento to protest against the threatened wiping out of the tariff. After a hurried conference with the large delegation of two from Tokay Town, it was deemed impossible to get an expression from the grape men in

time, and that the only practical move was to pass it up to the assembly and senate in the form of a resolution from these bodies opposing the tariff change, and both these houses did pass a hasty and insufficient declaration, which we wired to Washington.

Other individuals and fruit agencies took similar action, but the point of interest to us here is that, while scores of financial, commercial and industrial interests were duly represented at Sacramento and Washington, our own great enterprise could rally but a corporal's guard of growers and shippers to oppose legislation affecting adversely a cash revenue of $8,000,000 coming to California from the sale of table grapes. Here was a business turning out nearly 10,000 carloads of fine and distinctive fruits annually with no one in particular responsible for its protection from harmful legislation or any other danger that might appear.

This must not be taken as in criticism of the individuals and organizations of this state engaged in the fresh grape trade. No men are more enterprising or resourceful than these. But it is an expression of regret that these producers and dealers have failed to provide a general plan, with their own agents authorized and equipped to handle all questions of common importance to this great fruit enterprise that contributes more tonnage to the eastern trade than all other deciduous fruit industries of the state, excluding apples. This is a condition of unpreparedness that every friend of the industry must deplore, and I believe some means of its correction will soon be provided. I am therefore advocating the formation of an organization, created and operated by the growers and shippers of fresh grapes, the duties of which shall be to look after and protect the commercial interests of the trade; to cooperate more effectively with the state and county horticultural offices in protecting and conserving the vineyards through more extensive field investigation and experimentation; to promote legislative measures bearing upon the success of viticulture and especially to procure the enforcement of all laws intended to improve the quality and pack of table grapes. I can see a vast scope of usefulness for such an organization and hope this meeting will advise a careful consideration of the subject herein proposed.

Speaking directly to the shippers here assembled, I believe it is a duty you owe to your growers and to yourselves to favor some plan or agency for handling the common difficulties and obligations connected with your distributive work. Assuming that each organization, firm and individual engaged in the business is already doing full duty to the growers and the trade, knowing that they are abreast of the times in their own fields, and believing they are cooperating with each other as far as possible in the absence of a general plan, I am yet firmly

convinced that there are some features of the table grape business that are necessarily not getting the attention they require. I know also that the producers of these fruits would welcome such an organization of interests, and that the business of all factors would be better served should such an agency be formed; that such an association of identical needs would not interfere with the rights or the business of any factor now in the field. It would promote all legitimate enterprise and hamper none.

It is known to all, that competitors in almost every line of trade have become associated for the enforcement of broad and legitimate policies connected with their business. Such cooperation has in most cases been beneficial to both distributor and consumer. One line of articles, for example, is excluded from the United States mails. The government knows this article is absolutely necessary to the public, but its unregulated distribution is dangerous. Through their organization the dealers now supply their customers on terms as favorable as those governing the mailable articles in which the same firms deal. Another commercial line has cut out 10 or 15 per cent of the cost of distribution by a simple agreement that conserves both producer and consumer, and I believe there are many items of administration and many troublesome conditions that could be disposed of in the fresh fruit business if similar plans could be adopted.

If the grape men had a live agency today, such meetings as this might not be necessary, or if these meetings were held they would have much better data for orderly and effective action. Many of the problems which now must be considered at mass meetings would be solved with much more economy. We would have more definite procedure in view toward the restoration of the drum pack in the eyes of the trade; more data upon the methods of compensating the grape packers; better cooperation with the raisin and wine men where these interests overlap in the disposal of certain varieties of grapes; better team work with the officials in the enforcement of the fruit standard laws; more progress in handling the vine diseases in cooperation with your viticultural officer, and a larger service in every department of the business. But above all, we would have an effective means to meet the sudden contingencies that may arise at any time to disturb the common welfare of all the factors engaged in this great industry. Such arrangement as is here outlined would not interfere in any way with the individual's affairs or be a combination in restraint of trade. It would be a legitimate and helpful association which would benefit producer, handler and consumer of our table grapes. No other branch of the fruit industry is liable to so many complications, and I believe such an organization as is here briefly suggested is both expedient and necessary.

DAY WAGE VS. PIECEWORK PAY FOR PACKING.

Paper read by Mr. M. F. Tarpey, Fresno, Cal.

"Experience soon finds the weak spots in our theories. This is especially so where we put into commercial operation the theories which we form as being the proper ones to pursue."

In the early handling of fresh fruits for Eastern shipment and their proper packing for transportation, the day wage system was, owing to the fact that there was no other guide at that time, generally practiced. It soon developed that the women who did the packing (women were very wisely chosen to do the packing because of their deft fingers and lighter hand) were unequal in their capacity to accomplish a given amount of work. Some, because of their greater alertness and other qualities, packed considerable more fruit than others. This led the commercial packer to adopt the piecework system, where each girl would be paid for the amount of fruit she had packed during the day. This was considered to have been a material advance, and soon became the general system.

By wider experience, we have learned that that system has its faults, and they are serious faults. It does not take long to evolve the tendency to earn the greatest amount possible within a given space of time, the consequence of which is that very much less care and attention is given either to the quality of the fruit packed or the character of the packing itself. The fruit which should not be packed, and which under the daywork system would not be packed, was hurriedly thrust into the crates without even the care required for the proper arrangement of the fruit in the baskets. The consequence has been very injurious to the fruit industry as a whole, for one bad cluster of grapes in a basket, and poorly packed, too, would not only ruin all the grapes in that particular basket, but likely ruin all the fruit in the whole crate. The buyer in the East who purchased that fruit was sorely disappointed at his purchase, and prejudiced to the extent that in his subsequent buying he was careful to pay as little as it was humbly possible for him to pay and obtain any fruit at all; all of which reacts to the great detriment of the fruit industry of the state, and owing to the fact that it was all too generally practiced has caused a serious loss to the growers and shippers of California fruit.

The day system of wage payment for packing will obviate a great deal of what is above complained of, as it tends to a more careful selection of fruit to be placed in the baskets and crates as well as a more orderly and artistic arrangement of the fruit within the baskets and crates, all which tends to better its carrying qualities and to better its appearance when opened for sale in the East, and the latter will, in my judgment, much more than compensate for any additional cost that the day wage system of packing might impose, as against the piece

packing system. And furthermore, with years of experience in packing, the women and girls who do that work have become more capable, and they will, I feel assured, if paid a good reasonable wage for their day's work, be better pleased as a whole with the day wage system than the piecework plan and will accomplish in the aggregate about as much for the money.

Of course, nothing conceived by the human mind or executed by the human hand is entirely perfect, but in my judgment the day wage system tends toward perfection, whereas the piecework system tends toward imperfection.

No doubt there are a number of deft fingered and alert-minded and bodied women whose capacity to pack larger quantities of fruit is rather exceptional, who would not agree with the views I have expressed, as they would earn considerable more money by following the piece system, but in the consideration of matters such as this being discussed, we must consider it from the standpoint of the great general average, and it is of that great general average that I am now speaking.

There is another matter that I think is of great importance to the grower and shipper of California green fruits, especially grapes, and that is the very serious expenditure that has been common in the past few years for ribbons, medallions, and other falderal in grape packing. I know, as well as I know anything, that the Eastern fruit buyer does not buy ribbons, medallions, or falderals; he buys fruit, and if there is any idea lingering in the minds of our growers and packers that it brings any premium because of those ribbons, medallions, and falderals, I consider he is laboring under a very serious error. Of course, given equal quality of fruit and one embellished with ribbons, medallions, and other falderals, the embellished package might sell for a little more than the plain package, but that is a matter of doubt, and admissible only as a presumption. I do feel, however, that if the custom is to be discontinued, it should be by general understanding among the California packers and shippers. I have spoken to several of them, and I have found none who did not agree with the views I have here expressed; provided, that all would discontinue it simultaneously. It is, of course, too late this year to expect to put that idea into practice, but I hope by bringing the matter to the attention of the people here at this time, that before the California growers and packers have invested thousands upon thousands of dollars in flimsy silk ribbonettes, medallions and falderals, etc., that they will come to a general understanding and agreement, and that *all* of them will hereafter discontinue that practice, and thereby save to the growers and packers of the state of California a number of thousands of dollars, which I could only approximate in the aggregate, but which are certainly large enough to attract the attention of all thoughtful business men.

NECESSITY OF VINE DISEASE CONTROL AND BETTER FIELD OBSERVATION.

By Mr. Chas. F. Collins, Horticultural Commissioner, Tulare County.

When the writer made his advent into Tulare County, thirty-one years ago it was a vast grain field with a bountiful crop ready for the harvest. Much of this crop was "volunteer" and produced simply by harrowing or disking into the soil the shattered grain of the previous year's harvest and trusting Providence for results. Under conditions then existing, the almost virgin soil would yield a profit provided sufficient rain fell at opportune times.

Unfortunately, a continual sapping of the energies of Mother Earth for a third of a century produces very similar effects upon her as upon us who till her surface, namely, we are depleted and numerous weaknesses and ailments develop which require the attention of a specialist to correct or alleviate. It is our opinion that the time was ripe several years ago for the services of such a specialist in Tulare County.

For the past fifteen years or more a trouble known locally as "black mildew" or "Spanish measles" has been found to a greater or less extent in the vineyards of our county. It is characterized by a blighting or drying up of the fruit at any stage before it reaches maturity, this depending upon the time of its attack, or in mild cases by a spotting which greatly injures the appearance and commercial value. There is usually little apparent injury to the vine. This trouble has gradually increased in virulence and area with time and the increased acreage until it has in the past few years become a serious problem in many of what were once our best vineyards.

Both the Federal Bureau of Soils and of Plant Industry have declared after careful examinations of samples from the worst affected of these vineyards that no disease is present, hence we must conclude that this trouble is due to some abnormal condition of the soil.

About five years ago another vine trouble of a different nature made its appearance, which destroys not only the fruit but in many cases the vine itself succumbs. This, like the so-called "Spanish measles," has manifested itself in various sections of our vine-growing district and become a menace to many vineyards.

At the request of the writer and others, members of the University staff and federal Department of Agriculture have on various occasions visited these affected districts and without exception pronounced the trouble serious, but no attempt was made at anything more than a superficial examination. As the owners of the affected vineyards, as well as many others, were not only willing but anxious to cooperate in every possible way with anyone capable of rendering assistance,

much dissatisfaction was expressed at the inability to even secure an attempt at investigation.

In September of last year, Mr. J. W. Jeffrey of the State Viticultural Commission was in our county on a tour of inspection of the grape-packing houses, and the writer called his attention to the conditions existing as stated. He expressed great surprise that no action had been taken in a matter which was obviously of such vital import to at least the various owners of the already affected vineyards and indirectly to the grape industry of the county, and promised to take up the matter of an investigation with the State Viticultural Commission.

This promise was promptly fulfilled and after a preliminary investigation by officials of the commission, Mr. Jeffrey was detailed to locate in our county and study the problem during a term of months. Mr. Jeffrey contended from the first that the trouble was soil conditions and not a specific disease, as was at first feared, and arranged with the federal department at Washington for analysis of soils and samples taken from the various infected districts.

With the aid of the knowledge thus gained he has conducted experiments in the application of fertilizers, lime and gypsum, as well as drainage and irrigation where necessity seemed to require, and the result is that in less than six months from the time of starting this work, we have good evidence that he is on the high road to a successful solution of some of our problems, the result of which may mean the saving of many thousands of dollars to the grape growers of this and adjoining counties.

Nor are these all of our troubles. A fine young apple orchard in a district far removed from our vineyards and a peach orchard still more remote from either of these are slowly succumbing to some unseen, adverse influences. These orchards have been given a superficial examination by soil experts and entomologists and the trouble pronounced serious, which is plainly apparent to the most casual observer, as evidenced by the many vacancies already existing and areas filled with dead and dying trees, but no solution has been suggested.

These are cases which like our grape troubles require study and investigation for an extended period of time by someone trained in this line of work.

I could relate many instances of this kind occurring in Tulare County, and the same conditions prevail in any of the more important horticultural counties of the state.

It is my opinion that the cause of 50 per cent of our horticultural troubles is beneath the surface of the earth. This statement is made deliberately and advisably after years of experience and observation. It may be too much or too little water or water applied at the wrong

time or in the wrong way. It may be an excess or deficiency of certain elements of the soil causing malnutrition, or in other words, an unbalanced ration for the plant.

Whatever the cause may be, the effect is much the same. The plant becomes unproductive and, unless remedial measures are adopted, eventually loses its vitality and dies.

Although the law governing the office of County Horticultural Commissioner defines his duties as purely executive, I know I am safe in saying that there is not a commissioner in this state who will not gladly assist to the utmost of his ability in this or any other work that will in any way aid the fruit growers; but there are some very good and sufficient reasons why he can not do all that is required for success in this line.

This is the age of the specialist and this work requires special training to fit the investigator for it. Furthermore, no commissioner of any of our more important fruit-growing counties, if he possessed all the available knowledge in the world on this subject, could possibly find the time to devote to investigations of this kind in addition to his regular duties.

Many cases are referred to us which are easy. The work of a few moments will reveal malignant root knot or crown gall strangling the life of the tree, or oak fungus sapping its vitality. Perhaps a gopher, with no regard for the high cost of living, has been subsisting for days on the succulent bark of its roots.

Often a little questioning and a very superficial examination of the soil will plainly indicate that extremes in moisture conditions or excess of alkali is the cause of all the trouble. While it is true that cases of this kind are of almost daily occurrence, it is also true that there are many of such an obscure, enigmatical and doubtful nature as to challenge the skill of the trained soil technologist and require his most careful observation and study for weeks, months or even years before definite conclusions can be reached.

The little leaf of the peach and other deciduous fruits has been studied for four years by the best authorities the federal Agricultural Department can furnish with almost no results to date.

We have long believed and are continually becoming more confirmed in our opinion that a specialist in this line of work would be a valuable asset and worth many times whatever salary his position may command to any of our fruit-growing counties.

We are living in strenuous times and facing an apparently inevitable world shortage of food supplies in the near future. The farmer is being coaxed and urged to produce every possible pound and meet, in so far as he can, this deficiency, and all available assistance should be at his command.

I think you will all agree that in many cases increased efficiency offers a safer and saner solution of this problem than increased acreage.

There are many hundreds of acres of trees and vines in Tulare County from which the owners are not securing the profits they might if soil conditions were improved, and they should be taught how this may be done.

PREDRYING OF GRAPES.

By W. Flanders Setchel, Fresno, Cal.

The subject with which I have to deal is one to which little, if any, consideration had been given by grape growers prior to the latter part of the season of last year, when early rains resulted in the loss of many thousands of dollars worth of grapes, a large proportion of which rotted upon the vines, whilst others were shipped in a weak condition, due to abnormal water content and exterior moisture. Many cars of these latter grapes were leaking grape juice before arrival at destination. Emperor grapes valued in excess of $100 a ton, failed to realize freight and refrigeration upon arrival at destination.

Coming to my actual experience in the predrying of grapes, it should be understood that this was limited to last season, and confined to experimental proportions. The experiments were, however, conducted under conditions such as to positively establish the practicability of predrying grapes for Eastern shipment upon a commercial scale.

A raisin dryer in first-class condition, and practically air-tight, save for the vents, was used for the purposes of the experiment. Heating was obtained by a boiler plate oil furnace, air circulation was secured by a three-foot fan placed over furnace, the return-air system being used. The grapes experimented with were picked wet with rain and atmospheric moisture, being in a condition entirely unsuitable for Eastern shipment. They were carefully laid upon raisin trays, the bunches not being allowed to touch each other. Car strips with small wooden blocks attached gave the needed clearance between trays in the stacks. The grapes were placed at the rear end of the dryer, the fore part being filled with wet raisins in various stages of drying. The grapes were subjected to a circulating air heat of 100 degrees for between three and four hours, and when removed, the skins and stems of the grapes were entirely free of external moisture, whilst the flesh on the berries was firm. The grapes were then placed in standard picking boxes and stood in the packing house about thirty hours before being packed and put into iced cars. This fruit was distributed over four cars, the bulk of which consisted of nonpredried fruit. The predried grapes were packed under a separate mark, but bore no indication to buyers by which they could be identified as different from the balance of the grapes, nevertheless, the predried fruit, without exception,

realized higher prices than the nonpredried, the average increase being 15 cents per crate. The cost of predrying figured out at slightly less than $10.00 per ton. In the case of a dryer specially equipped to handle table grapes, the cost would be materially reduced. A successful predrying plant for grapes must embody in its operation, first, a minimum of handling of the grapes and minimum of cost in operation. To this end, the dryer should be an integral part of the green fruit packing house. The grapes should be picked in boxes having open sides, so that no further handling of the grapes will be necessary from picking to packing, provided the boxes are dry to commence with.

In estimating the economic value of this experiment, insurance against loss through a recurrence of the early rains of last year represents but a fraction of its real significance. With a predrying plant as part of the equipment of the green fruit packing house, late grapes can be harvested during the entire working day, notwithstanding the morning dews, which commonly necessitate postponement of picking until 10 a.m. and frequently later. Further, grapes can be gathered and shipped after rains when those without predrying facilities must wait for their grapes to dry on the vines, thus affording bare markets for those more fortunately situated through possession of a predrying plant. Even under circumstances where the condition of grapes makes it possible to ship them with but a slight risk of decay, predrying will pay liberal dividends upon its cost, owing to the greatly improved carrying qualities of the grapes if predried. Toward the latter part of each year, fear of rain causes grape growers to hasten the completion of their season's shipments, regardless of market conditions, through concern as to the possibility of a rain, whilst where a predrying plant is available, the period of marketing can be safely and materially extended, thereby improving market prospects, both for the nonpredried and for the predried grapes, the former being freed of the competition they would otherwise experience from the predried grapes were they marketed at the same time.

In the case of Emperor grapes, it is now an established principle that packing in drums or kegs must be completed prior to the coming of the early morning dews. With a predrying plant, there is no such limitation, and should at any time the sugar content of Emperor grapes under the Standardization Law be raised, a predrying plant would become a requisite of every packing shed handling this variety of grapes. The Eastern trade, owing to their severe losses last year upon drum Emperors purchased f.o.b. California, will approach these grapes more warily in the future, but one can predry their drum Emperors for less than $10.00 per ton, and either guarantee their condition to the purchaser or ship East and carry in cold storage at one's own risk, with the assurance of extremely gratifying results.

Railroad rates are about to be increased substantially. Every cent of increase in freight and refrigeration rates is a direct loss to the grower, because the Eastern trade figure their cost of our products on a delivered basis, whether they buy f.o.b. California or through their auctions. Inversely, therefore, every decrease in freight and refrigeration charges puts money directly into the pockets of the growers.

The orange growers now effect a material saving on a portion of their shipments by precooling and using dry cars, which are iced at a designated icing station en route to destination, the shipper assuming responsibility for deterioration of the fruit. It is my opinion that future experiments in the predrying of grapes should be conducted along such lines as would demonstrate the practicability or otherwise of packing and shipping predried grapes in ventilated dry cars without cooling, to be iced at a designated icing station under similar conditions to those obtained by the orange growers. The commercial value of predrying under any of the beforementioned conditions would then be fully established and a very material saving in refrigeration charges would be insured, resulting in direct annual saving to grape growers and, equally important and remunerative to growers, a higher standard would be established as regards condition of fruit at delivery in our Eastern markets.

DISCUSSION OF A DAY WAGE IN GRAPE PACKING HOUSES.

A discussion ensued on the question of a day wage as against piecework in the packing of grapes, but no action was taken at the conference because of a difference of opinion, and it was thought that as long as there was not unanimity of feeling on the point at issue, the meeting should not be called upon to take any definite action.

The following resolution was adopted:

Resolved, As a result of the discussion held this day at a mass meeting of grape growers, packers and shippers of this section of California, it is the sense and sentiment of all concerned that we cooperate fully and heartily with the State Board of Viticultural Commissioners in an endeavor to completely correct conditions apparently at the source that have interfered with the proper and successful carrying of Emperor table grapes packed in sawdust and shipped to the markets of the United States and Canada. We propose that no grapes showing surface moisture or mold shall be packed and, that if necessary by reason of wet climatic conditions, such grapes shall be subjected to complete surface drying process for the purpose of removing any and all moisture that may cause decay. We will be obliged if our State Board of Viticultural Commissioners will give this advance assurance to the handlers and marketers of our grapes in all parts of the country.

STATE BOARD OF

VITICULTURAL COMMISSIONERS.

Office: State Capitol Building

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San Francisco.

H. F. STOLL (at large)
San Francisco.

PAUL MASSON (at large)
San Jose.

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Sacramento.

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California's Grape Industry

BULLETIN No. 10

ISSUED FEBRUARY 1, 1918, BY THE

State Board of Viticultural Commissioners

CALIFORNIA STATE PRINTING OFFICE
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BULLETIN No. 10

BY THE STATE BOARD OF VITICULTURAL COMMISSIONERS
SACRAMENTO, CALIFORNIA

FEBRUARY 1, 1918

A season of rather remarkable results has just closed for the viticultural interests of California, conservatively estimated to represent a value of $150,000,000. There has occurred a complete revival of intense interest in every branch of the vineyard industry because of profits and because of varied conditions that augur well for the grapevine and its products.

In this bulletin the State Board of Viticultural Commissioners offers accurate information regarding the past season and present viticultural activities, as well as constructive suggestions along the lines of preservation and future development. The Viticultural Commission has been constant in giving aid and advice to all who have asked it and has used its appropriations in a manner best calculated to be of practical benefit to those whose interests are in vineyard properties. It has not waited for formal requests, but, rather, has anticipated the needs of the vineyardist and has labored with him in hundreds of instances in his own field, not for a single day or week, but over a continuous annual period so as to be able to conduct investigations and observe the results of experimental work in each particular instance. Some of this work is referred to later on in this bulletin.

FREE DISTRIBUTION OF GRAPE CUTTINGS.

In its constant desire to elevate standards of production of grape varieties in California and to offer to the country the best fruit that may be obtained anywhere in the world, this department of the state government after thoroughly discussing the subject at several meetings has decided to inaugurate practical experiments in different sections of the state in the cultivation of the vine known as the Ohanez variety

of Almeria grapes. These are the grapes better known to the Eastern consumers of table grapes than they are to our own California people. They are cultivated to a limited extent in this state and their presence in the markets of the East is due not to production anywhere else in this country but to extensive importations from Spain.

In normal seasons over 500,000 drums of these grapes come into the country from Spain and the method of shipment is in kegs with a packing of cork dust surrounding the bunches of grapes. The notable characteristic of this variety of grapes from the Almeria district of Spain is its keeping quality and for many years it has had a monopoly of the Eastern market. The fruit has often commanded from 25 cents to 50 cents per pound because of being there in fresh state in the winter season. Whatever competition there has been has come from California in a limited way in small shipments of our Emperor grapes which are packed in kegs or drums in redwood sawdust.

The Emperor grape is not as good a keeper as the Almeria article, and yet we believe the Spanish variety may be cultivated in this state extensively and successfully. There are a few small plantings in California now and the product of some of these vineyards has demonstrated this year their wonderful keeping qualities. The berry is of greenish cast somewhat similar to the Malaga, but very often showing spots on the surface of the berry due to a natural characteristic of the grape.

This board desires to encourage extensive experimental work in the cultivation of this variety and will be prepared on February first to send to all who inquire as long as the supply lasts a number of these cuttings, free of all expense excepting what the express charges may be from Dinuba, California, to the post-office addresses of those who may wish to experiment. The cuttings will be tied in bunches of twenty-five, and we would prefer limiting the number to each individual to fifty of such cuttings in order that the supply may serve a wide distribution. We suggest that the experimental work in this direction be attempted in almost every section of the state in order that we may observe results and be able later on to advise intelligently where these grapes may best be grown. We suggest that they be planted to some extent even in the coast counties as well as in the interior valleys and also in the foothill regions in the various localities of the state. It is only by means of such wide distribution and the planting under various climatic and soil conditions that we may be able to ascertain just what the grape is worth to the state.

The fruit matures rather late in the season and for this very reason it may be that some localities are unsuited to its cultivation. Our experience in a limited way with the Almeria grape indicates, first of all, its wonderful keeping qualities and retention of firmness even

under adverse conditions of storage. If we can produce and harvest these grapes extensively and successfully we will have made a great stride toward serving ourselves and the consumers in the Eastern markets of the country with a most delicious winter grape.

Let applications for these cuttings be directed to the Board of Viticultural Commissioners, State Capitol, Sacramento, California. There will be no charge whatever for the canes and the only expense to be borne by the applicant is the slight cost of transportation.

The cuttings are being gathered now by the State Board of Viticultural Commissioners at some considerable expense and we hope also to be able to furnish for experimental purposes a limited quantity of cuttings of the Black as well as the White Corinth grape. These are commonly known as the Zante currant and our country over a great period of years has relied entirely for this currant on importations from Greece, the amount imported averaging 45,000,000 pounds annually. There is no reason why we should not also produce Zante currants in California and we mention this in connection with the Almeria offering in order that we may have some experiments also in the cultivation of the Zante currant. There are few Zante currants grown in the state in a commercial way but we have had sufficient observation to induce us to believe that there should be greater plantings of this particular variety which always commands in dried state a fancy price in the markets. There will not be at our disposal a large quantity of cuttings of the Zante currant but we will gather as many as possible and distribute them under the same auspices as above mentioned. Unlike the Almeria grape the Zante matures early and in all favored localities the drying process may be safely resorted to without more than the ordinary chance of unfavorable weather.

On receipt of applications for any of these cuttings this office will take pleasure in acknowledging the application and in giving brief and proper directions as to the method of planting. We trust that the experiments will redound to the great good of the state commercially.

THE APPLICATION OF THE FRUIT STANDARDIZATION LAW TO THE TABLE GRAPE PACK.

The present fruit standardization law as applied in the inspection work on grapes was the subject during the season just closed of considerable discussion, particularly in the great grape growing sections of Fresno and Tulare counties. In the month of September last, the Board of Viticultural Commissioners held one of its regular meetings in Dinuba and, as is its custom, the board invited vineyardists in that section to come to a conference after the regular routine work of the board was finished. About forty vineyard owners, shippers and

packers of grapes came to the conference and brought formally to the attention of our board a complaint about the lack of uniformity of inspection work in the counties of Fresno and Tulare. Both counties enjoy the distinction of having particularly efficient horticultural commissioners and the sincerity and energy of neither commissioner was questioned. Tulare County growers, however, claimed that the method of inspection of Horticultural Commissioner Collins of their county was at variance with the inspection work in Fresno County and was so much more rigid than the Fresno County method that it operated against early shipments from Tulare County and permitted early deliveries from Fresno County.

The complaint made to our board at that time was not so much against the method employed by either commissioner as it was a plea that both county horticultural commissioners adopt the same method and thereby give both counties an equal chance in marketing early grapes. The executive officer of this board had the pleasure of interviewing Commissioner Roullard, of Fresno County, and Commissioner Collins, of Tulare County. Each presented his ideas as to how the inspection work should be conducted and the entire controversy may be said to have been one of difference of opinion unattended by animus on either side. The growers of Tulare County were anxious to know in advance of another harvest season what could be done about the matter and State Horticultural Commissioner G. H. Hecke and Chief Deputy Geo. P. Weldon were brought into the breach in accordance with the standardization statute which provides that in the event of a difference of opinion between county horticultural commissioners the state officers shall decide on the method of inspection.

A practical solution of the problem was reached in a meeting called on January 11 by Mr Hecke at Fresno. At this meeting there were present Mr. Hecke, Mr. Weldon, county horticultural commissioners of San Joaquin, Stanislaus, Merced, Kings, Fresno, Tulare and Los Angeles, together with growers, managers of shipping houses in that section and the executive officer of the Viticultural Commission. A free and frank discussion of the subject consumed two hours' time and at the conclusion of the meeting at the suggestion of Mr. Hecke it was decided to create a special office of general inspector for the counties of Fresno and Tulare who will have entire charge of standardization work the coming season. He will be provided with a plan of inspection by the State Horticultural Commissioner and will enforce its provisions alike hereafter in both counties. This would seem to be the common sense solution of the problem and no doubt both communities will be satisfied with the work the coming season.

RESTORATION OF CONFIDENCE IN THE EMPEROR PACK.

A subject which has been of intense concern to this board for the past year has related to the sawdust pack of Emperor grapes. A year ago these Emperor grapes arrived in Eastern markets in rotting condition and the houses that had purchased them in California in carload lots suffered in many instances an entire loss. The grapes had been packed in this state during, or immediately after, rainy weather and they were not free of surface moisture. As a matter of fact, many bunches of grapes developed mold while hanging on the vines and the vital mistake was made of packing them in sawdust when they were in this condition. Most of the Emperor grapes so packed are sold outright at the shipping point in California or on a guarantee basis and in most instances these grapes were paid for before they were opened up in the Eastern markets.

After the shipping season closed over a year ago, this board followed the pack to the Eastern handlers and made inquiry as to their condition when opened up. Almost without exception the Eastern houses reported the grapes in unmerchantable condition due to decay. Some letters received by this board bitterly denounced the pack and the greater number of the comments were of such similar tenor that it could readily be seen much mischief had been done.

To undo this damage, if possible, became the concern of this board, and immediately we set about to remove skepticism for the following season. We got into touch by correspondence with practically all of the large handlers of Emperor grapes and offered them as great assurance as we could possibly make in the matter of guaranteeing a perfect pack for the following year. All through the year 1917 we spread the gospel among the Emperor growers and shippers in the Tulare section and had no difficulty in convincing them that a poor pack of Emperors in sawdust was worse for the state than no pack at all. We followed this missionary work from day to day and from grower to grower and, in the meantime, we kept in touch with the houses of the East that had been handling this particular pack.

When the season of 1917 was approaching we watched the sawdust shipments into the Emperor section and discovered with alarm that inferior material in this line was being sent to some of the growers and packers. Vigilant inspection work caused rejection of the sawdust and later shipments that came in were then found to be perfect. The harvest season approached and the growers and packers were all alive to the necessity of putting up nothing but the best. Climatic conditions were all in their favor. Employees of this department made tours of inspection of the packing sheds while the Emperors were being prepared for shipment and everything possible was done to enforce the greatest care in the pack.

In a measure, through assurances of this board in collaboration with the shipping companies, skepticism of the Eastern handlers was removed and they took a chance again in purchasing Emperors in drums. The result was gratifying indeed and the best evidence of the quality of the pack of Emperors in sawdust is given in more than one hundred letters received by this board recently after it had written Eastern houses asking for their experience with our Emperor pack of 1917. For the information of those who produce this variety of grape we publish just a few of the letters for the purpose of showing the extent to which confidence has been restored and for the purpose also of cautioning growers and shippers to continue to be exceedingly careful in the future to keep this confidence by continuing season after season to send to the markets of the East only fruit that is right when it leaves the shipping points in California. In giving a few of these letters to the public we omit the names of the firms writing them but we give the localities from which they come.

The following are fair samples:

Chicago, Ill. We have been very much pleased with the quality and general condition of these packages this season. We doubt if it would be possible to show any improvement over the grapes we handled.

Indianapolis, Ind. Due to the high price that prevailed on imported Malaga grapes, we handled at least 500 per cent more California kegs of Emperors than usual and found quality and condition to be far superior to what they have been heretofore. We have not seen any imperfect keg grapes this season. We believe you have made quite a stride in this line.

Waterloo, Iowa. We had three straight cars of Emperors, the quality and condition of two of them being fully satisfactory. One car upon arrival showed decay. We also received L. C. L. shipments from other markets and found the quality of those Emperors to be excellent. Taking the situation as a whole, the quality has been a great deal better than was the case a year ago.

Wichita, Kansas. The grapes both in kegs and drums never were as nice as this year. They kept first class—we never sorted one.

New Orleans, La. We are pleased to report that the keeping quality of the Emperors in kegs and drums this past season was remarkable. We handled a few cars and take pleasure in saying that at this writing (December 29) we still have some on hand that show no signs of any decay. We believe that the careful selection of the grapes and the careful packing of same had a great deal to do with this.

Duluth, Minn. We are very glad to be in a position to tell you that the drum Emperors were the finest grapes that we have ever received from California. In fact, they were so satisfactory and it was such a pleasure to handle them that we wrote Mr. Chas. Virden, of the California Fruit Distributors, and told him so at the time the grapes arrived.

St. Paul, Minn. We are pleased to say that the condition of the Emperors on arrival here was highly satisfactory and so far this season (December 22) we have not found a poor keg of grapes.

Butte, Montana. We are pleased to inform you that all of our grapes arrived in very fine condition except two carloads of late Tokays. They came from a late district and the grapes were not well colored and did not seem to have any keeping quality. All the Emperors we have drawn were of excellent quality. That includes kegs as well as lugs. We have had Emperors up until today (December 22) and they gave universal satisfaction.

St. Louis, Mo. It is with a great deal of pleasure that we write you that the pack and condition of the grapes was perfect this year. After our disastrous 1916 season, contrast was especially marked and we received repeat orders regularly. As the crate grape season was over somewhat earlier this year than usual, we recommended the drum grapes to a great many of our trade and the result was as satisfying to us as we know it was to those who bought them. We believe that if the same care is exercised at the shipping point next season as it was this season, you will have established a permanent demand for this product as we believe they will hold their own with the imported Almeria grapes. We believe that your board had considerable to do with the good results obtained this year, and the shippers certainly owe you a vote of thanks. We might add that the receivers and consumers should also join in.

New York, N. Y. We shipped more cars than ever before and with one or two exceptions we have received nothing but complimentary remarks about the quality, pack and condition of our brands. We attribute the little difficulty we did have to delays at shipping point. Taking it all in all, we believe it has been a most successful drum Emperor season from the jobbers' standpoint, and, for that matter, from everybody's standpoint and we have your board to thank for the good work it has done in restoring confidence of the jobbers in general throughout the country in this package.

Cincinnati, Ohio. We had two cars of Emperors which proved to be very satisfactory. Both arrived in elegant condition and we are only sorry that we did not have more as the trade took to them nicely and we feel that there is a good future for this sort of pack.

Columbus, Ohio. We have found Emperor grapes packed both in kegs and boxes in sawdust this season to be of very good quality and they have given general satisfaction to the buyer. We trust that another season we will find the pack even better.

Cleveland, Ohio. We handled two cars of Emperor grapes and found them much better this year as to condition and keeping quality. We trust that another season you will be able to still improve the grade of the grapes, because, if you can, we are sure we can work up a big trade and can buy and store them so that we can have drum grapes even after the first of the year. Up to this time we have been afraid to carry them any great length of time on account of decay developing, but we have had good success this year.

Portland, Ore. We consider that we have one of the finest cold storage plants on the Pacific coast, but even at that, our lug box Emperors packed in sawdust did not keep until Christmas. We commenced to move them right after Thanksgiving and are cleaned up at this writing and are glad to get out without losing any money on them. We have two-thirds of a car of Emperors and one-third of a car of Almerias in kegs, which were placed away at the same time and they seem to be keeping in perfect condition, particularly the Almerias. We appreciate the fact that climatic conditions at the time these grapes were picked, along with the importance of being placed in good dry storage, has everything to do with the keeping quality. By way of a suggestion, we might state that if the stems were allowed to dry a little more before being placed in either kegs or lugs it would help the keeping quality of the

grapes a great deal, as in repacking the lugs we find some which were 100 per cent sound. Upon closer examination we conclude that the stems on these grapes must have been perfectly dry when placed in the boxes.

Philadelphia, Pa. We beg to advise that all of the Emperors in kegs and drums that we saw on the market this season showed a generally satisfactory condition with the exception of four or five cars that showed stem mold. The season for them was the best perhaps that the industry has ever had due to the generally good buying power of the people and to the further fact that the foreign grapes were very short in quantity as compared with previous seasons. There is no doubt but that there is a splendid future for California Emperors in kegs and drums, but the greatest care must be taken by the packers to pack only when climatic conditions are favorable. However, when the Spanish grapes are plentiful, only the very best California fruit will sell along side of it, while any carelessly packed fruit will be sure to sell at a loss.

Pittsburg, Pa. Would say that this has probably been the most successful season yet, so far as the goods arriving in sound condition was concerned. Any grapes showing good high color were in good demand—but some of the stock which showed off or greenish color was inclined to drag somewhat, more so with the first arrivals. Foreign grapes for the most part showed more or less weakness and this helped the sale of California Emperors very materially when showing good quality, color and condition. All parties taking part in the putting of this product on the market in the best manner possible are certainly to be highly commended for the efforts put forth. There is a great future for these grapes for the holiday trade as well as six weeks prior to that time, so it is a business worth while investigating to the very fullest extent in order that only first-class goods be used in the packages. Some of the grapes arriving were packed in a cardboard drum package, and this was not nearly so desirable as the wooden receptacle.

Memphis, Tenn. We received two cars of Emperors this season. One car was medium-sized berries and a little shriveled. These grapes decayed very quickly. Large plump berries carry for sixty days and we have but little trouble with them.

Waco, Texas. It affords us the utmost pleasure to state that of the several cars of California grapes handled by us during the past season, not one reached us but in the best of condition and the quality of the fruit itself was all that could be desired. We believe that the reclamations we were called upon to allow would not aggregate a five-dollar bill. The improvement in every respect as compared with former years was most noticeable and we are inclined to believe that the efforts of your department are certainly bringing splendid results.

Ogden, Utah. The cars of Emperor grapes handled by us this season were very satisfactory indeed; in fact, these grapes were bought early in the season and we had grapes to sell for our Christmas trade. We believe that there was a vast improvement over the season of 1916, as last year we had considerable trouble on account of mold. Cars that came to us this year were packed in very dry sawdust and this, we believe, helps to keep the grapes. From our point of view, this is a very satisfactory package and we enjoyed a very nice Christmas trade on Emperor grapes packed in kegs.

Spokane, Wash. We are glad to report that on our keg grapes this season we did not suffer any trouble with shrinkage, cleaning up all we had early in December. We, however, had some shrinkage in boxes packed in sawdust and some of them went bad to the extent of fifty to sixty per cent. In some boxes there were only nine or ten pounds of good grapes. The Emperors that we received in four basket crates and in lug boxes loose were with a few exceptions the best we have ever seen. The writer is not an expert in telling the difference in the quality of grapes, but it

would seem to him that some of the grapes that we examined showed too much moisture, as the sawdust was clinging to the stems and a good many of the stems were green and we do not believe that the grapes would have kept satisfactorily much later than the early part of December. Furthermore, some of grapes put into kegs did not show as good color as they should.

Milwaukee, Wis. We have your letter in regard to Emperors packed in kegs and drums. We handled a number of cars of them this year and they arrived in fine condition and sold very well with us. We, like a lot of other men, were afraid to take hold of any great quantity because of the sad experience we had last year, but this year the grapes were very fine and they came out in good condition, at least what we had. We were going to keep about five kegs over and see how long we could keep them, but our trade insisted upon having them so we were unable to do this.

OBSERVATIONS AT OUR DINUBA BRANCH STATION.

Following the recital of Emperor pack conditions in the foregoing title and paragraphs, we deem it advisable to publish the observations of Mr. J. W. Jeffrey, who, for more than a year, has been in charge of investigations for this board in the vineyard properties in the great area of vines in the Emperor section of California. The recital of the work done there and all details of it, including platting of diseased sections of vineyards, the analyses of soils, the application of fertilizers, the installation of drainage systems and many other features necessary would consume too much space in a general bulletin. We give, however, a general statement from the officer in charge of viticultural investigations and it is worthy of close perusal. It follows:

"Fresno and Tulare counties during the viticultural season of 1917 were the centers of unusual activity in the marketing of table grapes and the production of raisins. Never before in the history of the table grape business in this state, perhaps, have such uniform and profitable crops been harvested or more progress made toward permanence and security in this branch of viticulture. This advancement is primarily due to the enterprise of the growers and shippers. It is now reaping the reward of cumulative experience and the use of improved methods of cultivation, packing and distribution. The profits of the fresh fruit industry have been unusual in these favored districts, running as high in extreme cases as $1,500 net per acre, and very often netting $700. In one instance a dozen consecutive cars of grapes sold at an average of more than $2,700, and these, with the high averages throughout most of the season, placed the past year far above all others in financial returns. Far-seeing growers and shippers do not expect these high prices for the coming years, but they have good reason to expect the business to remain profitable under the improved cultural and marketing conditions which are now prevailing. This record is in strong contrast with the experiences of 1916, and is referred to here to show how some of the mistakes and misfortunes of that year have been overcome through greater care in handling the crops aided by better weather conditions.

"The producers and distributors of table grapes realize that an unusual number of favorable elements combined in 1917 to produce

such remarkable returns, and that such a run of circumstances may not occur again for some time. No previous season had been marked by such uniform and long continued fair weather for ripening and harvesting the fruit. Neither rain nor frost marred the crops or prevented the steady delivery of fruit to the end of the season. A serious car shortage, together with better distribution, kept the demand active and prevented the glutting of the markets. Eastern weather was generally favorable to a lively trade and the consumers were financially able to pay fair prices. These and favorable causes gave stability and composure to the business, and the use of better packing material aided materially in producing the splendid record of the season of 1917.

"The market for drum-packed Emperor grapes had suffered alarmingly, caused by the poor keeping quality of the fruit in 1916, and to prevent its recurrence the shippers and horticultural officials early in 1917 set about to correct the mistakes and prevent the misfortunes that had so seriously impaired the business of the preceding year. To this end, at the close of the late disastrous season the secretary of the State Board of Viticultural Commissioners began a wide correspondence with the table grape distributors in the East, inquiring especially about the quality of pack and the keeping character of fruit sent forward in sawdust. Before the close of the year the secretary had received more than 150 replies, from which he made a careful digest of information to be used in public meetings designed for the betterment of the Emperor pack throughout the districts of Fresno and Tulare counties. In a majority of these replies the fruit jobbers complained of the inferior keeping qualities of the grapes and a large number intimated that they would have nothing more to do with the sawdust pack from California. This digest was published in Bulletin No 8, issued February 15, 1917. Our board promised in this bulletin to hold meetings, issue warnings, investigate the condition of packing materials, make experiments in predrying and to notify the trade that great efforts would be made to improve the conditions complained of by the Eastern handlers of this fruit. This promise has been fulfilled concurrently with the investigational work laid out by the board for the vineyards of the San Joaquin Valley.

"In pursuance of this plan many public meetings and committee conferences were held throughout the district early last year by the board, at which the fact was established that a large percentage of the Emperor crop of 1916 had been packed damp, or damaged by the rains before packing, and many growers claimed that the use of inferior sawdust had much to do with the season's losses. Therefore a thorough examination of the sawdust supplies was ordered as the supplies arrived. The first receipts were wet and mouldy, running as high as 28 per cent moisture in one lot and averaging more than 20 per cent in one series of tests. One shipment of 5,000 sacks and another of 3,000 were destroyed by a shipper and many smaller lots were discarded. The publicity given to this matter aroused public sentiment, the press gave great assistance which with the vigilance of the packers removed all cause of complaint and at the beginning of the packing season last fall not a pound of inferior sawdust was to be found in the Emperor grape districts and to some effect the result of better material is found in the reports from the Eastern markets the past season.

"Arrangements were made at the Dinuba station last fall for the removal of surface moisture from the grapes before packing, the experiments to be made on carload lots to test the efficacy of this plan. In the meantime a large grower of Emperor and Almeria fruit at Dinuba built a special plant for this work, equipped with furnaces, large electric blowers, circulating pipes and trackage especially designed to carry the grapes from the wagon through the drying rooms and to the packing table with one handling. There are 16 drying rooms each operating separately and capable of treating many carloads per day. Both of these propositions failed of trial because of the total absence of rain or dew during the season, but these plants will be ready for use the coming season should weather conditions demand. It was intended last fall to make heavy pickings immediately following rains and thus attempt to prevent incipient decay. Most important results are sure to follow these experiments when adverse weather again prevails and it is the purpose of the board to keep the growers and the trade advised as to the success of this plan.

"Our board will continue the work of the Dinuba station for some time on account of the continued interest of the grape growers and the evidence of substantial progress. A year of pathological study and practical soil work has shown that most of the vine troubles are due to soil irregularities and water supplies and the consequent low nutrition of the plants; that no specific diseases abound and that possibly all of the maladies may be controlled when practical experiments have demonstrated sufficient improvement in handling the land. The board is convinced of the value of continued soil tests and observations and by the end of the present season will have collected much data to show that the use of certain soil correctives together with deeper cultivation and the more regular distribution of soil moisture will in large measure solve many of the difficulties. The effect of this practical work is already felt and the growers who one year ago believed that plant diseases were ravishing their vineyards are now devoting their energies to better tillage and more rational methods of fertilization.

"The troubles found in the Fresno-Tulare districts are met with in some other parts of the state, and may be summarized as follows: Damage and death to vines caused by the concentration of alkali; the prevalence of 'little leaf' which dwarfs and often kills the plants; premature decay of foliage causing or concurrent with the production of worthless fruit; 'black spot' or the so-called Spanish measles, rendering the fruit unfit for shipment or drying; late starting of spring growth producing barren canes yet without affecting materially the summer growth of the vines; grape knot causing the total destruction of two or three vineyards during the past year, and the most prevalent of all troubles, namely, the gradual failing of vines where the subsoils have become impervious to air and moisture. The sum of losses from one or more of these conditions throughout the state can not be estimated, and all but the first named are probably due to physical deficiencies of the soil. If this diagnosis of these vine troubles is correct no one can doubt the value of field work with fertilizers, deeper and better cultivation, the addition of humus and the testing of every means promising to restore the equal functioning of the whole root system of the vines.

"Space in which to elucidate the character and soil environment of maladies above noted is not available in this bulletin. The problems of hardpan and drainage alone would require extended notice, for these problems lie at the root of most vines that are actually dying. These subjects are being investigated and will have great bearing upon the public project of drainage that is now having the attention of the whole district. Sufficient data upon all the contributing causes has been gathered to show that in the future more attention must be given to the underground problems of our vineyards, and that only through an extension of field work can a general improvement of vine conditions be secured."

GRAPES ON EXHIBITION.

This board believes that no favorable opportunity should be lost in the matter of displaying the viticultural products of California. Thousands of our own people are unfamilar with the great extent of the industry in this state as compared with viticulture in all of the other states of the Union. The numerous varieties of grapes cultivated in this state are little known to our own people and with this idea in mind the board decided to make an exhibit of grapes at the California Land Show in San Francisco last October. It proved to be one of the prominent features of the Land Show and at the request of the executive officer of this board Viticultural Commissioner H. F. Stoll, of San Francisco, was asked to contribute to this bulletin his impressions of the importance of making exhibits of this nature at opportune times whenever there was a prospect of great attendance.

The impressions of Commissioner Stoll are as follows:

"An excellent medium for acquainting the general public and the strangers in our state with the importance of California's grape industry was the educational exhibit installed by the State Board of Viticultural Commissioners at the California Land Show, which, during the fifteen days between October 13 and 28, attracted over 500,000 visitors. Although the greater part of the grape crop had been harvested, over 150 varieties of wine, table and raisin grapes were displayed through the courtesy of Professor George C. Husmann, of the United States Department of Agriculture, Professor Frederic T. Bioletti, of the University of California, Professor F. Flossfeder, of the University Farm at Davis, and a number of prominent vineyardists in the different grape centers of the state.

"The exhibit was housed in an attractive rustic pergola booth decorated with trailing vines, and was in charge of Mrs. Margaret Colson from the office of the board. Her familiarity with the subject enabled her to impart valuable information to all interested in California's extensive grape output. In addition, she distributed a brief but comprehensive leaflet containing accurate statistics and answered the inquiries of many prospective growers who were anxious to learn the actual conditions of the various branches of the grape industry, locations of suitable lands for grape culture and facts concerning profitable varieties, prices, cost of cultivation and means of transportation.

"The greater part of the grapes displayed came from the experimental stations of the United States Bureau of Plant Industry at Colfax and Oakville, where are being assembled and tested on resistant stocks all the grape varieties of the world thought to be of value to the Pacific coast, and from the Fresno station, where similar tests are being made of raisin, currant and fleshy varieties. The exhibit included raisins, wines, grape juice, some of the by-products of the wineries and sample drums showing how the Emperor and Malaga grapes are being shipped to Eastern markets in redwood sawdust.

"There were beautiful clusters of Black Hamburg, Burger, Cornichon, Flame Tokay, Malaga, Mission, Muscat of Alexandria, Petit Syrah, Sultanina and other well-known raisin, table and wine grape varieties, as well as many striking types not so familiar to the public. Take, for example, the tiny Zante Currant, which is getting a foothold in California; the Gros Colman, with luscious berries as large as cherries; the Almeria, which is imported in such quantities from Spain during the winter months and which, it is hoped, will be produced in commercial quantities in this state before long; the Petit Pinot, the principal grape used in champagne making, the Zabalkanski, Black Monnuka, Dattier De Beyrouth, Damascus, Golden Queen, Olivette Blanche, Red and White Hanepoot, Rodites, Terret Monstre and many others.

"Important land and industrial shows are being held throughout the United States each year and I believe the State Viticultural Commission should make a study of these opportunities and participate in the more important ones with instructive displays such as the one installed at the Land Show in San Francisco. From the first of July, when grapes ripen in the Imperial Valley, almost up to the Christmas holidays we could display fresh berries in any part of the United States, owing to the improved methods of packing and transportation. During the balance of the year there is ample material available, such as processed grapes in attractive jars, photographs of the vineyards and the various products of the vine. From the wonder and enthusiasm expressed by visitors from the Eastern and Middle Western states, I am satisfied such exhibits would prove a revelation, because only a comparatively few people outside the borders of California realize that our grape acreage is twice that of all the other states in the Union combined and that, owing to our diversified soil and climate, we are able to grow over one thousand varieties of European, Asiatic and other types which can not be cultivated on the other side of the Rockies."

SOME INTERESTING FACTS ABOUT CAR SHORTAGE DURING THE GRAPE SEASON.

During the table grape season of 1917 there was consternation at all the shipping points in California over delays and difficulty in getting refrigerator cars with which to ship crated grapes. It seemed for a time as if the transportation companies were not supplying half the cars needed, and as a result of the delay and shortage many cars of table grapes were not in prime condition at the time of loading in

refrigerator cars. To this shortcoming principally was due occasional disappointing sales when fruit reached the Eastern markets, although the general average was exceedingly good.

As a matter of fact, more cars were supplied by the transportation companies for the shipment of grapes from California than ever before in the history of the state. Notwithstanding this fact, there was a shortage of the required amount but many shippers have been led to believe by vague reports that the usual number of cars was not furnished. This is an error. As stated before, more cars were obtained and used for the shipping of grapes than ever before in the history of the state and growers will realize the correctness of this assertion when we tell them that 16,564 refrigerator cars were used during the season in carrying grape shipments out of the state. In this same connection we should give the information that 4,000 of these cars of grapes were wine grapes and never before in the history of the industry in California have so many carloads of this variety of grapes been exported. The demand for wine grapes in the Eastern markets was most unusual and unexpected but it promises to be an important feature of our viticultural industry in the future.

We may say, therefore, that 12,564 cars of table grapes went out of the state, as well as 4,000 cars of wine grapes, making a total shipment of all grapes, as stated before, 16,564 cars. Shipments of wine grapes contributed to the shortage of cars for the shipment of table grapes, and yet the total of table grape shipments exceeded the season of 1916 by 2,664 cars. This explanation of apparent car shortage in the state during 1917 will be interesting information to distributors of fresh grapes.

TABLE GRAPE PRODUCTION FOR 1917.

The principal localities in the state from which table grapes are shipped are the counties of Sacramento, Placer, El Dorado, San Joaquin, Merced, Madera, Stanislaus, Fresno, Kings, Tulare, San Diego and Imperial. Other counties shipping in limited quantities are Sutter, Contra Costa, Yuba, Colusa, Santa Clara, Los Angeles and Yolo.

The total number of straight carloads of grapes of all varieties shipped out of the state, including table grapes as well as wine types, was according to railroad figures 16,564. This total is not segregated by the railroads as between table and wine varieties, but our information gathered from almost every source gives the total of wine grape shipments as 4,000 carloads, leaving the total shipments of table grapes outside of the state 12,564 carloads.

It is always estimated in figuring the total production of table grapes in the state that 1,000 carloads are made up of shipments within the state and small express shipments out of the state. Therefore, we may

safely say that there were produced in California during the season of 1917, 13,564 carloads of table grapes. In this total of carloads of table grapes there were 450 carloads of drum grapes—that is, grapes packed in sawdust in kegs or drums.

The average car of table grapes contained 1,000 crates, a net weight of grapes amounting to 13 tons to the carload. Table grapes shipped in this form and in lug boxes, therefore aggregated the total bulk or weight of 170,482 tons.

Grapes shipped in drums packed in redwood sawdust totaled 252,000 such packages, and the net weight of grapes in this number of packages was 4,032 tons.

The total bulk of table grapes produced in the state in 1917 and shipped as such variety was 174,514 tons.

The harvest season for table grapes was ideal. It extended throughout an unusually long period and many more carloads would have been shipped if refrigerator cars had been available. Lack of the required quantity caused thousands of tons, particularly Tokays, to be sent to the wineries and it is roughly estimated that these manufacturing establishments used 100,000 tons of our table grapes in the form of straight pickings, second-crop grapes and packing house culls. Generally speaking, grapes thus used by the wineries were made into Tokay, Angelica and Malaga wine, as well as Sherry material and brandy for fortification of all sweet wines. It is thought that as much of the bulk of Tokay grapes went to the wineries as was shipped East in crated form for table purposes. To this condition alone is due the fact that almost a normal production of sweet wine was made in the state in spite of the fact that 4,000 carloads of wine grapes ordinarily used in the state were sent to Eastern markets.

Growers of table grapes realized very satisfactory prices in Eastern markets and at home. During part of the season carloads of table grapes sold as high as $3,000, but this figure was unusual. Average prices ranged from $1,400 to $1,800 per carload; then, of course, many of the cars sold for much less than this figure. The lower sales were due, however, to several causes. Car shortage and congestion in some of the markets brought the selling prices down; and, in addition to this, many carloads of grapes that were in prime condition when packed remained so long in the packing sheds without refrigeration that they did not arrive in the Eastern markets in first-class condition. It was not because the grapes were not in good condition when packed, but the delay in loading had a deteriorating effect on the quality when they were opened up in the markets.

It may be safely estimated that the table grape crop produced in the state and shipped in the form of crates and lug boxes totaled a selling figure of $17,500,000. After deducting freight, refrigeration, selling

expenses, loading, packing and the cost of crates there was a net return to the growers of $8,000,000 for their grapes at the packing sheds. This amount, of course, was not net profit, as out of it comes the harvesting of the crop, the care of the vineyards throughout the year, taxes, depreciation, etc.

The Emperor grapes packed in sawdust averaged about $2.75 per drum, f. o. b. California, and in the estimate in the foregoing paragraph we have included these sales.

The only criticism here in connection with the general pack of table grapes was that of lack of color in some varieties. This was due to climatic conditions beyond the control of the producer and it had no serious effect in the selling markets.

WINE GRAPES AND THE PRODUCTION OF WINE IN THE VINTAGE OF 1917.

The total production of wine in the state for the vintage season of 1917 was approximately 36,600,000 gallons. This production was less than the production of 1916 by about 5,500,000 gallons. The shortage was in both the sweet and dry types of wine. Sweet wines fell short of the 1916 production by over 2,500,000 gallons and the dry wine output was less by 3,000,000 gallons. The shortage is more than accounted for by the shipment out of the state to Eastern markets of 4,000 cars of wine grapes during the 1917 season, together with light crops in some of the wine producing sections as well as the imposition by the government of a fortifying tax on sweet wines three times the tax of the previous year.

SWEET WINES.

The following tabulations show the sweet wine production in the state during the vintage season of 1917:

Sweet Wine Produced in Counties of First Internal Revenue District.

	Port	Sherry	Muscat	Angelica	Madeira	Tokay	Malaga
Fresno	1,921,294.42	2,662,807.44	869,498.75	501,181.67	29,126.03	56,254.58	----------
Kings	----------	718,875.89	231,287.67	----------	----------	----------	----------
Madera	389,117.52	85,676.08	8,267.23	108,867.41	----------	----------	----------
Merced	235,249.79	196,231.10	----------	----------	----------	----------	----------
Napa	12,075.66	----------	38,138.80	17,628.94	----------	----------	----------
Sacramento	625,986.40	1,049,869.15	37,719.71	217,038.63	----------	----------	----------
San Joaquin	1,413,799.52	855,512.62	63,253.90	538,298.00	----------	----------	89,747.13
Santa Clara	124,739.27	64,856.35	23,133.22	19,991.13	----------	----------	----------
Solano	2,583.20	----------	----------	----------	----------	----------	----------
Sonoma	3,237.02	----------	----------	3,508.79	----------	----------	----------
Tulare	110,324.26	171,786.50	----------	12,304.94	----------	----------	----------
Yolo	1,851.18	1,313.34	3,155.27	1,910.79	----------	----------	----------
Totals	4,840,268.64	5,806,928.47	1,324,457.61	1,420,730.30	29,126.03	56,254.58	89,747.13

Total gallonage 13,567,512.76 of sweet wine, First Internal Revenue District.

Sweet Wine Produced in Counties of Sixth Internal Revenue District.

	Port	Sherry	Muscatel	Angelica	Malaga	Marsala
Los Angeles	63,123.45	175,528.58	26,209.34	17,080.55	3,391.15	
Riverside	475,115.98	164,805.95	107,892.37	77,566.08		
San Bernardino	603,280.04	691,040.57	83,808.51	369,354.90	19,776.06	140,021.81
Totals	1,141,519.47	1,031,375.10	217,910.22	464,001.53	23,167.21	140,021.81

Total gallonage 3,017,995.34 of sweet wine in Sixth Internal Revenue District.

Total Sweet Wine Production in State, 1917 Vintage.

	Gallons		Gallons
Port	5,981,788.11	Tokay	56,254.58
Sherry	6,838,303.57	Malaga	112,914.34
Muscat	1,542,367.83	Marsala	140,021.81
Angelica	1,884,731.83		
Madeira	29,126.03	Total	16,585,508.10

The total production of sixteen and a half millions of sweet wine for 1917 was reached under a 30 cent tax on the brandy used in fortification of this wine. This production fully supports the contentions and assurances of those who went to Washington, D. C., to wage before Congress the reduction of an exorbitant tax which would have destroyed the sweet wine industry. Insistence on a tax of $1.10 was resisted by Californians and a reduction to 30 cents was finally accomplished. This rate in itself was three times the tax the year before; but California wine men promised to make an effort to bear their full share of war burdens and produce as near as possible a normal vintage even under a trebled tax. That this has been practically accomplished is shown by the foregoing table of sweet wine production. It indicates a total of 16,585,508 gallons for 1917 as against 19,262,475 gallons for 1916.

Government tax features in connection with the making of these sweet wines are interesting. The wine makers used 3,763,885 proof gallons of grape brandy in completing the manufacture of these wines and thereby paid the government $1,129,165.50 in taxes.

When the 1917 production of sweet wine is sold, it carries with it another tax of 20 cents per gallon and thereby yields the government additional revenue in the sum of $3,317,101.60. Therefore, the production of sweet wine in California for the single year of 1917 yields to the United States Treasury a total sum of $4,446,267.10, or nearly 27 cents per gallon for every gallon produced.

To produce this quantity of sweet wine in the state during 1917 it required the crushing of approximately 200,000 tons of grapes. The aggregate sum paid to the growers of these grapes was $2,750,000.

The grapes required to produce brandy for commercial use prior to the suspension of such production on October 4, 1917, totaled 34,500 tons, yielding the growers of such grapes approximately $518,000.

Grape Brandy Produced in 1917.

	Gallons
First Internal Revenue District.	
Tax paid	6,229.5
Warehouse	1,152,165.4
Used in fortification	3,157,175.6
Total first district	4,315,570.5
Sixth Internal Revenue District.	
Warehouse	120,556.1
Used in fortification	606,709.4
Total sixth district	727,265.5

Total brandy production for 1917, 5,042,836 gallons.

DRY WINE PRODUCTION.

No accurate record of dry wine production in California is obtainable, because this class of wine is made without government supervision and private records of inventories of this class of wine as far as individual producers are concerned are not given out. This department, however, is in a position to make a fairly accurate estimate of the dry wine production from the general knowledge of the output by counties, and we give this estimate in the following tabulation:

	Gallons
Alameda County and bay cities, including wine made in cellars of foreigners in San Francisco	3,000,000
Napa County	3,000,000
Contra Costa County	500,000
Mendocino County	250,000
Sonoma County	5,000,000
Santa Clara County	2,000,000
Santa Cruz County	20,000
Sacramento County	800,000
Lodi section	3,000,000
Fresno section	300,000
Southern California	1,650,000
Various other sections	500,000
Total	20,020,000

It required 148,000 tons of grapes to produce the amount of wine indicated by the above tabulation. The purchase price of these grapes ranged from the low figure of $15 per ton to the maximum figure of $35 per ton.

In dry wine varieties there are Claret, Zinfandel, Burgundy, Cabernet, Chianti, Hock, Riesling, Sauterne, Chablis, and Gutedel types. These are generally classed as the table wines, consumed usually with meals. Large quantities of a certain grade of clarets are made in the interior counties of the state in sections known as sweet wine sec-

tions: It is possible even in the very warm climates to manufacture dry wines where the wineries are equipped with means of refrigeration for cooling the must during the process of fermentation. The better and higher-priced types of dry wines, however, are made without this means in sections that are known as dry wine districts. These localities are Mendocino, Napa, Sonoma, Contra Costa, Alameda and Santa Clara counties, where, almost exclusively, the table or dry wines are made. In these counties grapes are usually higher priced than in the sweet wine districts but the production or tonnage per acre is not as great as is obtained in the interior valleys where all of the sweet wines are made.

It is likely that several millions more gallons of dry wine would have been made in the state if such a large quantity of the early dry wine grapes had not been sold for shipment out of California. This was an unusual feature of the past vintage and it should be welcome news to the growers of wine grapes in the state for the business is very likely to increase and the probability of overproduction of wine grapes and consequent lowering of prices to the producers is rather remote in the years to come. The price paid for these wine grapes which were sent out of the state ranged from $16 to $22 per ton; and when these were disposed of in the East the delivered price was in the neighborhood of $60 per ton. It seems unbelievable that Eastern manufacturers of wine could afford to pay this price for fresh grapes delivered to them, but it was a fact, nevertheless, and the innovation opens up a new avenue, not alone for the distribution of the wine grapes of California but for the application of a new system whereby the crushing of the grapes may be done in California and only the juice shipped to the East. This would bring about a tremendous saving in freight and the discard entirely of refrigeration charges. It is not unlikely that the fruit companies marketing these wine grapes may, in the future, make arrangements for the crushing to be done here and the shipment of the juice by means of a preservative.

It is reported to us that the greater bulk of these 4,000 cars of wine grapes was sold to the foreign element in the various communities of the country in lots as small as one, two and three tons out of a carload. In some instances, Eastern wineries bought in larger quantity and used the grapes in connection with Eastern grapes. The American varieties of grapes grown in the East are generally very low in sugar and high in acid; while the European varieties grown in California are just the reverse. The combination, therefore, makes a happy blend and enables Eastern wine makers to produce better standards of wine.

CHAMPAGNE.

The production of champagne in California is increasing year by year and in last year's output approximately 200,000 gallons of dry wine were used. The making of champagne usually takes place in the summer, in advance of which the cuvees, or blends, are assimilated. The wine is bottled and fermentation in the tightly-corked bottle is induced with the aid of grape yeast and after many months of watchful care in the cellars where these many thousands of bottles are in the racks the final disgorging process takes place and the new corks are inserted.

The fame of California champagne is fast spreading and the output in the state for the season of 1917 is estimated at 65,000 cases. A case of champagne contains about three gallons of wine, whether it be a case of twelve quarts, twenty-four pints or forty-eight half-pints.

UNFERMENTED GRAPE JUICE.

The manufacture of grape juice in California has dwindled to an extent which makes the production now almost unappreciable. The standard of this article in the matter of flavor seems to have been established by Eastern grape juice manufacturers, who use almost exclusively the American grape of the Concord variety. These grapes are not grown commercially in California as the state over a long period of years has drifted to plantings of the European types of grapes.

There was made in this state, however, during 1917 about 60,000 gallons of unfermented grape juice requiring about 400 tons of grapes. Competition is found difficult and the market is not active for the California article. Even this production is not certain of sale and in such event the unfermented grape juice is then turned back into the winery vats at fermenting season for recovery of its value in the shape of wine.

RAISIN PRODUCTION IN 1917.

The crop of raisins in the state during the season was tremendous. It exceeded the normal production by about 30,000 tons and the best estimates of the entire raisin production in the state aggregated 163,000 tons. This means more than 500,000 tons of fresh grapes which were dried, yielding the above tonnage of raisins. The market price for all of these raisins the past three months has made the raisin output of California for one season reach the aggregate selling figure of about $25,000,000. The Muscat and Thompson's Seedless varieties, which constituted considerably more than half of the entire raisin crop, brought 9 cents per pound packed, while other varieties brought lower figures ranging downward two or three cents. The selling price, how-

ever, must have averaged about 8 cents per pound and thus the value of one raisin crop in the state reached the total in dollars above mentioned.

The production in the state segregated by varieties and by counties is given in the following tabulation:

County	Quantity in tons				
	Muscats	Thompsons	Sultanas	Malagas, Black Grapes and Fehrzagos	Total
Fresno	81,500	30,000	6,250	6.000	123,750
Kings	11,000	350	575	100	12,025
Tulare	9.000	6,500	3.100	1,500	20,100
Kern	750	200			950
Madera	1,000	150	25	250	1,425
Merced	10	350	15	150	525
Stanislaus		150	25		175
Sutter	75	2,000	10		2,085
Yolo		800			800
San Bernardino	315		500		815
San Diego	350				350
Totals	104,000	40,500	10,500	8,000	163,000

No grape growers in the state in the past few years have been so favored as those who have produced the raisin varieties. The raisin business several years ago was lifted out of a rut by cooperative effort and the bulk of the crop is now handled by an organization of growers having its central office in Fresno. At the head of this organization, which is known as the California Associated Raisin Company, is Mr. Wylie M. Giffen, one of the State Viticultural commissioners. The association has been exceedingly prosperous which means, of course, that the growers who are members of the association have also received handsome returns for their raisins. There is a small balance of the raisin crop handled by independent companies but the general average of prices has been maintained by cooperative marketing.

Thompson's Seedless vineyards in the Fresno and Tulare sections of the state have been known to yield for the past three years $500 worth of raisins per acre and some Muscat vineyards have produced an annual yield of $350 per acre. From these figures the value of a raisin vineyard of this character may well be imagined and it is little wonder that there have been in the past three years such extensive plantings of the Thompson's Seedless grape in Fresno, Tulare and Sutter counties, as well as in other counties adjoining these localities.

Not only does California supply practically the entire raisin consumption in the United States, but it also exports raisins in large quantities and in a year like the present when there are comparatively no importations of Zante currants from Greece the state of California caters exclusively to the demand in the United States. That this

demand has continued and has increased is borne out by the fact that with three successive increasing crops of raisins there is no surplus and already at this writing over two-thirds of the raisin production for the season of 1917 has been sold, leaving a balance in warehouse of less than 40,000 tons to cater to requirements for the next nine months. At the present time, there is no more healthy branch of viticulture in the state than the raisin industry and it is likely to continue for many years to come.

The season of 1917 was the most favorable harvest period ever experienced in the state for the raisin producers, and there is but one suggestion which this board thinks to give at this time relating to our raisin crop. It is to be noted that early in the harvest season there is anxiety among the owners of raisin grape vineyards to get the crop of fresh grapes off the vines onto the drying trays. There is the ever prevailing fear of early rains and in the season just closed it was noticeable that many of the raisin grapes were gathered before they had reached their maturity in sugar content. As a matter of fact, the sugar standards of raisins were lower the past season than for previous seasons and the growers and packers should bear in mind that this practice should not be encouraged. It may finally have the effect of generally deteriorating the quality of California's raisin pack and this would bring about an unfortunate situation. At the present time there is some discussion as to putting a standardization law on the statute books relating to raisins as well as to other dried fruits. Similar laws apply now to fresh fruits and during the period between now and the next session of the legislature it is likely that standardization of the raisin pack may be seriously considered for the primary purpose of upholding the name of California for the excellence of its raisins.

It has been noted also in the great raisin producing sections of Fresno and Tulare counties that there has been much delay in unloading the sweat boxes of raisins at the various packing sheds. On some occasions growers have had to wait from thirty-six to forty hours before being relieved of their truck loads of raisins. This naturally caused some complaint against packing house facilities, but these houses in turn claim that a great deal of the delay and difficulty would be obviated if the growers supplied themselves with sweat boxes in greater number. It is claimed at the packing sheds that some growers have only enough sweat boxes to haul one truck load of raisins to the packing house and that they should have three times that number in order to facilitate the passing of the raisins from the vineyards into the hands of the packers. There is no question but this would help the situation considerably, but it seems desirable also to increase the capacity of the packing sheds and install improved methods of unloading the trucks and teams.

PERSONAL IMPRESSIONS AND COMMENTS BY VITICULTURAL COMMISSIONERS.

In the preparation of this bulletin each individual State Viticultural Commissioner was requested to write for publication his impressions on viticultural matters in the district which he represents. It was thought that this general comment might be worth while and we append the following brief observations from the members of the board:

Mr. C. J. Wetmore, president, commissioner at large.

As commissioner for the state at large, I take pleasure in reporting that there is a better feeling existing among vine growers than has been shown for many years. They have received good prices for their grapes and the wine makers remunerative returns for their products. The table grape and raisin producers have also received the best prices ever known and have made money. The year 1917 was, therefore, an excellent one for all persons interested in the viticultural industry and it can no longer be said that growers of wine grapes should pull them up because it does not pay to raise them. At the present time the growing of wine, table and raisins is one of our most profitable agricultural pursuits and has done more to make California known to the world than any of the other industries of the state.

Will this prosperity in all branches of our industry continue? It surely will if we are not hampered too much by adverse legislation. The table grape and raisin industry are not directly attacked, but the enemies of the wine industry seek to destroy it. If they accomplish their purpose, a great injustice, in my judgment, will be done to the grape growers and wine makers who have spent hundreds of millions of dollars in establishing beautiful vineyards and imposing wineries and have done so through advice of state and government authorities. After being so advised, will the people of the United States take away their property without compensating them for their loss? I do not believe they will. The grape growers and wine makers simply ask for justice and nothing more. If the people of the United States could vote on national prohibition it would never carry. Legislatures do not always carry out the wishes of the people.

The grape growers and wine makers believe that wine is a temperance drink and the use of it should be encouraged to stop drunkenness. Statistics will show that all wine drinking countries are temperate ones and no drunkenness exists. The juice of the grape becomes wine by Nature. Man simply helps Nature. Surely Nature's drink should not be condemned.

Mr. Paul Masson, San Jose, commissioner at large.

My life work has been the cultivation of the grapevine and the making of wine. Our bulletin as a whole treats exhaustively of conditions affecting other branches of the industry.

Last year's viticultural conditions in California must not be compared with any previous years. Circumstances made them abnormal in many respects. The fluctuations of the taxes on both sweet and dry wine; the shortage of last vintage; the excellence of same; the difficulties of transportation; the lack of proper labor; the embargo on exports from France; the consequential demand for our products from other foreign countries; the pending application for a divorce between wine and liquors; the steady and rapid progress of Phylloxera; the uprooting of thousands of acres of vineyards; the replanting of none, and, last but not least, the continuous attacks of the prohibitionists have all been concurring causes disturbing viticultural conditions with their conflicting influences and tending both to help and to hinder the vineyardist.

In spite of all, the prices of our products never were so high; and, in spite of all, the value of our vineyards never was so low, exposing an anomally which can not last. The vineyardist is now in the midst of a storm and has lost his bearing. Storms often cause wrecks, but storms also are followed by calm, and a frightened or timid sailor has a poor chance to reach port.

All these conditions presented themselves last year to our commission and complicated our work very materially. Although I feel that it is not for us to give ourselves deserved compliments, I, as one, have the satisfaction of knowing that our time and efforts were not altogether given in vain and that a spirit of false modesty should not prevent us from being proud of our work.

Mr. Sheridan Peterson, Santa Rosa, commissioner first district.

The year 1917 for the grape growers and wine makers of Sonoma and Mendocino counties will undoubtedly be remembered as the banner year for high prices in the history of the industry. While the crop was far below normal, owing to the ravages of Phylloxera and the damaging effects of the late frosts of 1916, it is safe to say that the quality of the grapes was never better and the weather for harvesting was ideal.

This encouraging climatic and financial boost for the vineyardist has caused much interest to be manifested in the possibility of this condition continuing for a sufficient length of time to warrant the planting of expensive resistant vines on lands which are practically unfitted for any other crop and the first viticultural district has thousands of such

acres waiting for legislation, such as our able representatives in Washington have tried so hard to get for us. In the meantime, let us keep a stiff upper lip, prune and cultivate our vineyards to produce the best results while trusting to the fairness of those who have our great industry in their hands for decision.

Mr. Frank T. Swett, Martinez, commissioner second district.

The district I represent comprises the counties of Contra Costa, Napa and Solano.

In spite of many handicaps, the most important of which was the scarcity of labor during the latter part of 1917, the grape growers of this district have had a fairly profitable year. While crops as a rule were not large, the quality was good and although picking was delayed owing to labor shortage, the rains held off so that every bunch was gathered. Prices ran from $23 a ton for ordinary wine grapes to as high as $30 a ton for hillside grapes and the choicer varieties. In most vineyards this insured a profit of $20 to $30 an acre for average crops and more where crops were heavy.

Prices on sulfur, for preventing mildew, were very high. While some advance over past years was inevitable owing to war conditions, the price of $60 a ton seemed to most growers exorbitant. Sooner or later a growers' organization should be formed for the purpose of cooperative buying of supplies of all kinds. It would be entirely feasible to form an organization similar to the supply company which is controlled by the orange and lemon growers of southern California and effect savings worth while on all supplies.

The table grape acreage in this district is not large, Muscat, Sultanina and Tokay being the leading varieties. Owing to the difficulty of obtaining cars, a considerable portion of the table grapes went to the wineries. Owing to the dry fall, however, a larger tonnage was shipped East than usual with fair returns. In many cases shipping companies made a guarantee of 75 cents a packed crate f. o. b. shipping point and in many cases their season's results showed a loss of from 5 cents to 10 cents a crate. This was partly due to heavy shipments overloading markets and to freight congestion which caused delays in transit and damage to the fruit.

Most of the wineries have sold the wine produced in 1917, several small cellars selling as low as 18 cents a gallon, while those which have held their wine have been offered as high as 30 cents.

There will be little planting this season owing to unsettled conditions and also to the impossibility of either securing imported grafted vines or supplies from nurseries in this state.

Mr. C. E. Bundschu, San Francisco, commissioner third district.

The vintage of 1917 has been a most satisfactory one for the vineyardists of the state. Santa Clara and Alameda counties are the largest grape producing counties in the district which I represent, and although the crop of 1917 was not as large as the year previous the prices obtained for grapes were higher this year than last. It is safe to say that this year's vintage was more remunerative than that of many past years and at the present writing it looks as if the wine grower can expect even better prices for his grapes and wine this coming season. Never did the wine industry of the state look more promising than at the present time.

San Francisco is the natural distributing center for California wines and from statistical records we find that there has been a decided increase in the shipment of wine as well as in price. We can safely say that the demand for California wines today is greater than the supply. There is, however, another side that blackens the horizon of a beautiful sunrise. National prohibition and local agitation are sufficiently active to curtail any further plantings until this most important question has been settled. In the meantime, unless our national government finds it necessary to restrict the sale of fermented liquors, the vineyardists of this state should find prices most encouraging for the replanting of vineyards. California, through its distributing center, San Francisco, will be called upon to supply a demand for wines which in the past has been supplied by Europe and, unless interferred with, this will prove to be the most beneficial to the state of California.

Mr. Secondo Guasti, Los Angeles, commissioner fourth district.

In regard to the situation south of Tehachapi, I would say that the crop of 1917 was approximately 50 per cent of normal. This was due to the fact that we had a very hot spell during the month of June which lasted four or five days and just at the time when the grapes were beginning to set. However, we made an excellent quality of wine the past vintage. The situation at present looks very critical on account of having no rain so far this season, and if it continues I am afraid that we will have another season like 1898–1899 when we only had 5.59 inches of rain, and if this should happen I do not think we would have one-third or one-quarter of a crop. However, we can not judge at present as we still have February, March and April for rain.

Regarding the stock of wines, mostly all of the "farmer wineries," as we call them, are sold out and there is very little wine left in the hands of these small producers.

In regard to the raisin grapes, I understand that everything in the way of raisins has been sold, but at what price I can not tell you

because I have heard so many different reports and I do not know which is right. A large quantity of wine grapes were shipped from here this last season, that is, shipped green to Eastern territory. The Santa Fe shipped about 200 cars and I believe we would be safe in saying that the Salt Lake and Southern Pacific shipped about the same amount.

Mr. J. E. Beach, commissioner fifth district.

The viticultural district which I happen to represent comprises twenty-two counties, perhaps half of which do not produce grapes commercially at all. Sacramento County concerns itself exclusively with table grape and wine grape production. Yolo County yields wine grapes principally but has, as well, a considerable production of table grapes used for canning purposes. Sutter County, as well as Yuba, has planted to raisin and wine varieties principally, and in the former county there have been extensive plantings of the Thompson's Seedless raisin grape. El Dorado and Placer counties are both wine and table grape producing sections while Amador, Calaveras, Tuolumne and Mariposa confine their cultivations almost exclusively to wine grapes.

The season has been a successful one in all respects. Crops have been universally good except in Sutter and Yuba counties, where they fell considerably short of normal, due to severe frosts in the spring and for that reason the raisin crop in that section was probably curtailed 50 per cent. Prices have been most satisfactory to vineyardists and shippers. In Sacramento County we have some selected packs of table grapes which bring fancy prices in the Eastern markets. Wineries in this district crushed heavily of wine grapes, and a noticeable feature of the season was the tremendous crushing of Tokay grapes by the wineries in this section. This was probably due to car shortage to a very great extent, but it is also a fact that the salvage obtained by hauling pack-house culls and second-crop grapes to the wineries was exceedingly gratifying.

We claim the distinction in our viticultural district, principally in Sutter County, of producing very choice raisins and the indications are that the continuation of the planting of raisin varieties will be the order of things for some time to come as market prices of raisins have justified considerable confidence. A most unusual number of wine grapes were shipped out of Placer County the past season to points in the East. As a matter of fact, the bulk of the wine grapes in the vicinity of Roseville, Loomis and Penryn were loaded in refrigerator cars for Eastern shipment and very satisfactory returns were obtained for them. I understand also that there was considerable drying of grapes in Colusa

County in the vicinity of Arbuckle, and as raisins were worth attractive prices this year growers no doubt realized satisfactory returns. One hundred cars of wine grapes also went East from Sutter and Yuba counties.

SUMMARY.

In summarizing the information contained in this bulletin the vastness of the grape industry in California, and particularly its financial importance, is demonstrated to an extent far beyond the belief of those who have had the most intimate knowledge of the vineyard business in all of its branches and angles.

We find that the income covering the single season of 1917 reached the almost unbelievable figure of $68,000,000. We have all along rated the investment in viticulture in California at $150,000,000 and the annual income would appear to make this estimate of value rather a low one.

The money brought into the state by the sale of the raisin crop will total $25,000,000.

The table grape crop has been sold at an approximate figure of $17,500,000.

The 4,000 cars of wine grapes sold in the Eastern markets brought into the state $1,020,000.

The total of 200,000 tons of sweet wine grapes crushed by the wineries brought the growers $2,750,000.

The 148,000 tons of dry wine grapes crushed by the wineries in the state brought the vineyardists $3,404,000.

The price received by the growers for 32,000 tons of grapes made into commercial brandy in advance of the government statute suspending the manufacture of brandy for commercial use was $416,000.

The selling price of the sweet wine production of the state for 1917 figured at the lowest price quoted to wholesalers throughout the country is $9,951,000.

The selling price of the dry wine production figured at the lowest market rate to jobbers at the present time is $6,700,000.

The commercial brandy production figured at the present market price aggregates $1,500,000.

The grand total, therefore, for all of the viticultural products of the state for one season reaches $68,241,000.

Respectfully submitted.

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J WETMORE, President.

E. M. SHEEHAN, Secretary.

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VITICULTURAL COMMISSIONERS.

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The Ohanez Grape

BULLETIN No. 11

ISSUED MAY 25, 1918, BY THE
State Board of Viticultural Commissioners
Sacramento, California

CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO
1918

THE OHANEZ TABLE GRAPE.
(Sometimes called the "Spanish Almeria.")

BULLETIN No. 11

THE OHANEZ GRAPE

STATE BOARD OF VITICULTURAL COMMISSIONERS
SACRAMENTO, CALIFORNIA

ISSUED MAY 25, 1918

The Ohanez variety of Almeria table grape is attracting widespread attention again in California, as the result of the free distribution by this board of some 20,000 cuttings of this variety of grape during the spring of the present year.

Over 1,600 landowners in California made application for these cuttings and we were able to accommodate 1,200 of them.

In our last bulletin we told of the possibilities of this grape and its wonderful keeping qualities, and we might add here that the Eastern handlers of table grapes are much interested in what California may do along the lines of cultivation of the Ohanez variety.

In sending out the cuttings during the months of February and March we told the applicants that we would have something further to say relating to this grape during the year, and we are now issuing this special bulletin in compliance with that promise.

The State Board of Viticultural Commissioners has in its office a set of illustrated volumes rated as being the most elaborate and exhaustive viticultural publication ever issued anywhere in the world. It is the *Ampelographie,* by P. Viala and V. Vermorel, the noted viticultural authorities of France. In that *Ampelographie,* which is issued in the French language, there is to be found the history of the Ohanez grape by F. Richter. We have translated the article into English, and it is given to the public as follows:

FROM THE
AMPELOGRAPHIE UNIVERSELLE
OF
P. VIALA and V. VERMOREL.

OHANEZ.

(F. RICHTER.)

Synonyms—Casta de Ohanez, Uva de Embarca, Uva Blanca (Spain), Alicante (Portugal).

History and Geographical Area. The Ohanez is a very ancient Spanish vine and the keeping quality of the grapes is excellent. Its culture in Spain has been very extensive during the last few years, particularly in the littoral of the Mediterranean, between Valencia and Malaga, but it is found a little everywhere in the Spanish Peninsula. The city of Almeria is the principal distributing point, as it is the center of fruit commerce, unique in the world by its importance inasmuch as they export annually more than 22,000 tons of grapes from the province of Almeria alone. It is surprising that a variety so valuable as the Ohanez, and which gives them so important a trade, is so little mentioned in ampelographic literature and that its origin remains so obscure.

I wish, first of all, to make plain that the Ohanez is absolutely distinct from the Ragol, which certain authors tend to confuse with this grape. The Ragol resembles the Ohanez very much at first sight, but it has neither the keeping qualities nor the delicacy of taste nor the fine appearance that distinguish the latter. It is generally agreed that the Ohanez comes from the region of Daria, in Ragol, and this is also stated by Simon Roxas Clement in his "Essay on the Varieties of the Vine Which Are Found in Andalusia." This assertion must be incorrect, for after the most searching inquiry that I have been able to make in the regions where the villages of Ohanez and Ragol are situated, and after the most careful reading of the records of these villages I have been able to establish that this variety was cultivated without doubt by the Moors, who have left some considerable vestige of the science of fruit culture. When they were expelled, the country remained uninhabited during a period of years; the ground remained uncultivated the full period of transition, and owing to these conditions, aided by the marvelous situation of the plain, amelioration was produced by the natural hybridation and the Ohanez as we know it today was the result.

It was to such a situation as this that the farmers of Castile, who, after taking possession of the country, restored the value to the ground and noticed this variety of grape stretching out its vigorous shoots in the trees. They quickly recognized the valuable quality of the fruit and saw again at Christmas time the superb clusters of grapes suspended from the vines in a state of perfect preservation. They multiplied the most fruitful stocks and thus made by this selection a well defined vine, to which the name of Ohanez was given and which seems to be the most justified.

Culture. The extent of the culture of the Ohanez is considerable. Beginning at Valencia, one finds it everywhere in the region of the Mediterranean—in Alicante, Gijona, Carthagena, Murcia, Almeria, and also in the mountainous parts of the province of Granada and almost to the plains of that city. In the province of Malaga are also some important vineyards.

I had the good fortune in the summer of 1901 to look over all of these interesting sections near the sea, and I must render praise to the growers of Gijona for the excellent quality of their grapes. The vineyards of Gijona, 14 miles from Alicante, at an elevation of 2,250 feet, and ten miles as the crow flies from the sea, are situated in a natural amphitheatre, having a most picturesque effect. All of these slopes are covered with retaining walls supporting the earth, behind which are found the stumps of the vines. The vines are trained on little trellises, or lattice work, falling over the walls, thus insuring the grapes the sun almost to October, the time at which the runners are tied up in the form of roofing over the grapes, to make them mature better and to give them the golden appearance so much sought after by the trade. The vineyardist often adds to the improvised roofing by artificial covering in order to protect the grapes during the winter, and in this way they keep the grapes on the stem during the bad weather. Thus one can see even until the end of February the magnificent bunches of grapes in the vineyards, and they are inspected carefully and often. They are harvested as the market demands and the prices received are very high, as grapes out of season are a luxury.

In the large vineyards of Almeria they do not follow the same course. The vines are planted 18 feet apart and are trained on immense trellises made of wire, 7½ feet in height from the ground and supported from distance to distance by large stakes placed 9 feet apart, the establishment of these trellises forming, one might say, an immense net with meshes 18 inches square of Nos. 12 and 16 galvanized iron, costing from 4,000 to 5,000 francs a hectre (2½ acres), according to whether the ground is level or undulating.

It is figured that a vine well taken care of in a favorable soil will give 165 to 220 pounds of grapes, which corresponds to a production of 8 to 11 tons per acre.

The chief question in the cultivation of the Ohanez is the artificial fecundation. The Ohanez is very susceptible to coulure. The stamens are very short and barely reach half the length of the vinifera in general. The natural fecundation is bad, always very irregular, and the largest part of the crop is often lost if they do not intervene in order to artificially fecundate the pistils either directly or by the

medium of a foreign pollen springing from other varieties. They have often interpolated in the plantings a variety indigenous to the soil, which is a *V. vinifera,* wild male, very vigorous, called Flor, having a very long blossoming period. The air, the wind and the insects scatter the pollen on the neighboring vines and the attentive vineyardist completes the work with the aid of a feather broom. Practical experience, however, has proved that it is not necessary to introduce a strange pollen, a treatment which is long and complicated; it suffices to use a bunch of feathers, shaking it well morning and evening for three or four consecutive days against the blossoms of the Ohanez. Certain growers simply pass the hand over the flowers, but it is better to use a little stick covered with soft feathers. As the Ohanez has a comparatively short blossoming period (of only a few days) it is necessary to be very attentive in order not to let pass the best moment to practice fecundation, an operation of the most importance. By this system the best grapes are obtained, the berries being regular in size, while the vines not fecundated produce loose bunches, irregular in size, unattractive in appearance and one-tenth of the weight of those that are fecundated by artificial means. I was able also to prove this again in 1901, in the beautiful plantations of MM. Vano Hermanos, on their fine estate at Santa Ana, near Valencia, as also in my own experience at Montpellier.

Topping is also practiced in certain places, at the blooming time or a little before; that is to say, they cut the extremities of the shoots at three or four leaves above the grapes, exactly as has been practiced for centuries on the vines in Asiatic Turkey, especially in the neighborhood of Smyrna, etc., particularly on the Sultanina, in order to render it more fruitful. In very good soils, where the vines are very vigorous, they prune off the leaves immediately following the commencement of the coloring of the fruit, in order that the air and the sun can penetrate the thick mass of foliage. The Ohanez can not be cultivated on low stumps—it will give nothing. It is necessary to give it a large development and to prune it very long on trellises in order to give it many feet of fruit canes.

The Ohanez is very subject to cryptogamic diseases, especially mildew, during the first stages of vegetation—that is to say, towards the end of June. These diseases are treated very easily by attaching the pulverizer to a stick in order to spread the liquid through the thick foliage on the trellises. In this way a large area of green can be conveniently covered.

In some locations they have already established numerous vineyards on American grafts. The Rupestris du Lot is generally favored, even in the most shallow ground. Thanks to irrigation, repeated during the

entire season, it gives most satisfactory results. I am convinced, however, that the hybrids of Berlandieri 420A, 34E and 301A will be more suitable and will produce better crops.

(NOTE.—A late account by Despessis states that the *Riparia X Rupestris* hybrids and 429A are the principal stocks now used.

The harvest begins during the first days of October and ends ordinarily before the rains come in November. There are some places where they insist that the grapes be of full golden color. In others, if the grape is golden it loses value for sale. In the province of Almeria they generally gather the grapes somewhat green.

Description. Vine large, arborescent and very vigorous; of spreading habit; bark course, thick, dark brown, becoming detached in large, irregular strips; trunk attaining enormous dimensions.

Buds glabrous, edged with rose; starting rather early (a few days after the Aramon); young leaves glabrous, bronzed, shining, thin. The blossom bunches appear late, at the sixth or seventh node, and remain small for a long time; the flowers are small, pale green and with very short stamens.

Canes long, thick and somewhat irregular; young shoots light green when herbaceous, very thick at the base but thin near the ends; laterals numerous; mature canes light brown with darker streaks; tendrils strong and discontinuous; internodes of medium length.

Leaves when full grown, large, five-lobed with well marked sinuses; the petiolar sinus open V-shaped; teeth angular in two series; glabrous on both sides, pale green and bulging between the main veins, often folded in V-shape, the veins pale green above. Petiole pale green, short. The dead leaves are yellow and remain long attached to the vine.

Fruit. Bunches over medium, with large voluminous wings which are often short and compact; peduncle long, reddish at base, very hard and woody, brittle, thick and pale green; pedicels rather short, thick, warty; rim of torus very large; brush large. *Berries* olive shaped, truncated; umbilicus depressed, very marked; color yellowish green, sometimes becomes golden on the side to the sun; large (length 25 mm., width 20 mm.), fleshy, crisp; thick, tough skin with noticeable veins; flavor sweet, tart and agreeable; flesh firm, adhering to the skin; ripening very late (fourth period); seeds very variable in numbers and size, from zero to four, which confirms the difficulty and imperfection of pollination.

Professor Frederic T. Bioletti, chief of the division of viticulture of the University of California, has observed during many years the Ohanez grape in its limited cultivation in California and at our request

he has prepared a statement of his observations in relation to this grape, as well as an advisory article on the subject of cordon pruning.

We acknowledge with thanks his contribution to this bulletin on the two subjects, and we have endeavored to illustrate as clearly as possible with the aid of half-tone cuts and drawings the pruning and training system which will be necessary in getting the best results from plantings of the Ohanez vine.

NOTES ON THE OHANEZ GRAPE.

By Frederic T. Bioletti.

The Ohanez has been grown in California for about forty years, but only on a very small scale and principally in collections. It has been tried in nearly all the grape-growing districts. In some it has produced fruit equal to that of Almeria; in others, the quality has been inferior. In practically all cases the amount of crop has been unsatisfactory.

The quality depends principally on the climate, soil, and water. In the cooler parts of the Coast region, the grapes only reach half size and never ripen. In some of the hotter interior districts where constant irrigation is practiced the grapes are large but juicy and with poor keeping qualities. At the Experiment Station near Tulare, formerly conducted by the University of California, grapes of perfect quality were produced for many years.

In the region of Almeria where most of these grapes are grown, the summer climate is very hot and dry. The winter rainfall is about 12 inches and the vines are irrigated once in June and, in dry years, again in July. The soils of Almeria, where this vine is successfully grown, are very varied in character. Most of them are moderately rich mellow loams. On the richest soils the quality is inferior. Most of the vineyards are situated on the coastal plain, but some consist of terraces on hillsides at considerable elevations above the sea.

The irregularity and usually small size of the crops of the Ohanez have prevented its cultivation on a large scale in California. Occasional large crops which occur, however, indicate that when we discover the proper methods we will be able to grow it commercially with success.

In Almeria, the vines are planted very wide apart, as far as 5 meters (15 feet) in some cases. Each vine thus occupies over 225 square feet of surface and there are only about 190 vines to the acre. Each vine has a single trunk 7 to 8 feet long, rising vertically to a wire netting or trellis stretched over the vineyard at 7 or 8 feet from the ground. This trellis consists of wires crossing at right angles and about 20 inches apart. From 10 to 15 fruit canes from 1 to 6 feet long are

left at the head of each vine and tied radially to the wires. Summer pruning consists in the removal of sterile water sprouts and tipping the bearing canes.

The cost of establishing a vineyard of this kind in Almeria and bringing it into full bearing is said to be from $300 to $400 per acre. A good vineyard, however, is very profitable, as it yields from 7 to 10 tons per acre.

The irregularity of bearing of the Ohanez is well recognized in Almeria. There it is ascribed to a defective formation of the flowers and is combated by artificial pollination. For this purpose, they use a variety called the Castiza whose red fruit is also exported in much the same way as that of the Ohanez. When the vines blossom, flowers of the Castiza are shaken against the flowers of the Ohanez or the pollen is transferred by means of a feather brush.

That lack of cross pollination is not the cause or at least the sole cause of poor bearing with this variety seems proved by Californian experience.

At the Tulare Experiment Station, the Ohanez was planted in a double row in the midst of a plot containing a large number of vine varieties. Abundant cross-pollination was inevitable. Nevertheless, very few grapes were produced in most seasons. Long pruning gave only a moderate improvement. Better crops were obtained when the vines were allowed to develop a long trunk along a wire in the form of a horizontal cordon extending 8 feet from one vine to the next. Still the crops were not quite satisfactory, even when many fruit canes were left.

It was noted in several cases where the Ohanez was grown on a large trellis or arbor that large crops were obtained. A marked case of this kind was noted in the garden of Francis Heiny at Brawley, Imperial County. A still more striking example was seen in the San Joaquin Valley. A row of Ohanez had long been cultivated along the edge of vineyard without producing any fruit worth mentioning. This row was finally abandoned and allowed to grow without pruning or care of any kind on a neighboring fence. The first year after the vines were thus abandoned they bore a very large crop.

The true explanation of the failure of this variety to bear and its cure seem to have been discovered in Australia. An excellent account of this matter is given by Despessis in the Journal of Agriculture of Victoria, Australia, Volume 13, page 461.

Observations in Australia indicate that the cause of small crops with the Ohanez is the failure to produce blossoms on the shoots arising from the buds left in pruning. What blossoms do form are said to set well, but the Ohanez produces few blossom buds on the main canes.

Blossom buds, however, are abundant on the laterals as on the laterals of most very vigorous vines. All that is necessary, therefore, if this observation is correct, is to leave laterals instead of main canes when pruning.

This explains very easily the large crops obtained occasionally on neglected or arbor vines in California. In ordinary pruning, it is usual to remove carefully every lateral, but in covering an arbor where a large amount of wood may be needed there is a natural tendency to leave at least some of the laterals. On an unpruned vine, they are all left.

The term lateral is used for a side or secondary shoot from the main cane. When a shoot grows from a vine bud, it forms a cane consisting of a series of joints or *internodes*. Between each two joints, there is a *node* at which there is a bud and a leaf and sometimes a bunch or tendril. In the axil or angle at the base of the leaf stalk, a side shoot often starts and grows into a cane similar to the main cane. This side shoot is called a *lateral*. Laterals bear the *second crop*. In pruning the Sultanina, it is good practice to leave two or three buds of the strong laterals on the fruit cane. In pruning the Ohanez in Australia they cut off as much of the main cane as possible and leave only one or two of the laterals several feet long for fruit canes.

Judging from all the data available, the most promising method of growing the Ohanez in California would seem to be about as follows:

Plant the vines only in the warmer sections. Space them 8 feet by 16 feet. Train them to 8-foot cordons trained on a wire at about 30 inches from the ground. Prune to lateral canes tied to a wire about 18 inches above the cordon.

The Ohanez usually forms abundant and vigorous laterals. Their formation could be insured by moderate tipping of the main shoots in June.

The overhead trellis system of Almeria has many advantages, but would be very expensive to install and maintain, and the work of pruning, tying, and harvesting would be very expensive.

CORDON PRUNING.

By Frederic T. Bioletti.

Explanation of the Cordon System.

Some vines do not bear satisfactory crops unless they are allowed to develop a long trunk in accordance with the nature of the wild vine, which is a vigorous, far reaching climber. This is the case with many extremely vigorous varieties like Emperor and Ohanez, especially when growing in rich deep soil with abundant moisture. One way of accomplishing this is the *cordon system* of pruning.

There are three common varieties of this system applied to the vine: (1) The vertical cordon, (2) The bilateral horizontal, and (3) The unilateral horizontal.

The *vertical cordon* (see Fig. 1) is the only form which is much employed in California. It is the most usual method of training the Emperor. It consists in giving the vine a vertical trunk about 50 inches high, with arms and spurs distributed equally over the trunk from 10 inches above the soil to the top.

This method is defective because the fruit is unequally exposed to shade, sunshine, and heat and consequently develops unequally in size, color, sugar, and time of ripening. It is, moreover, impracticable because after a few years the lower parts of the trunk, on account of the dense shade to which they are subjected during the growing season, finally fail to produce new growth. All old vines trained in this way finally cease to be cordons and are simply very high-headed vines with the growth all at the top. (See Fig. 1.)

The bilateral horizontal cordon (see Fig. 2) consists in giving the vine a vertical main trunk about 18 inches high, which forms a horizontal branch on each side, stretching until it reaches the branch of the neighboring vine. It differs little in principle from the next form, but is less advisable, because of the difficulty of keeping a balance between the two arms. There is a tendency, hard to counteract, for one arm to absorb most of the vigor of the vine. The consequence is uneven development and a loss in both quantity and quality of crop.

Fig. 1. Old vertical cordon (Emperor).

The unilateral horizontal cordon (see Fig. 3) is to be preferred to either of the two preceding. It consists of a single trunk rising with a gentle curve to a height of 18 to 30 inches and then extending horizontally until it reaches the neighboring vine. When complete, a row of cordon vines of this form looks like a thick rope or cable stretched across the vineyard. It is

from this appearance that the system gets its name "cordon" which means "rope."

Fig. 2. Bilateral horizontal cordon (Colombar).

The trunk should be bare of all growth from the ground to the highest point of the curve. From this point it should be provided with a spur finally developing into a short arm, at every 8 to 12 inches. These arms should all be on the *upper* side of the trunk.

The pruning of these arms may be short, half-long, or long, according to the variety.

Fig. 3. Unilateral horizontal cordon (Semillon).

FORMATION OF THE CORDON.

Only the unilateral horizontal form will be considered, as it is preferable in practically all cases.

Plan and Spacing of the Vines. Only the most vigorous vines should be trained in this way and they should be given abundant room. A spacing of 6 feet by 16 feet, giving 450 vines per acre is about the minimum, and 8 by 16 feet, or 340 vines per acre, or even 10 by 16, or 272 vines per acre, is better with the most vigorous varieties in the richest soil.

Supports. The cordon requires a trellis which, however, need not be erected until the end of the second growing season. For the first two years, a temporary, light three-foot stake is sufficient. (See Figs. 4 and 5.)

The trellis consists of two or more wires stretched along the row between posts at each end and supported by stakes between the vines.

The lowest wire is to support the trunks and should be at about 20 inches from the ground, for the closest planting, up to about 30 inches, for the widest. No. 10 or 11 galvanized fencing wire is suitable.

The second wire is placed about 18 inches higher. This wire is to support the growing shoots and the fruit canes in long pruning. It is better, though not strictly necessary, to have two wires at this height. These wires are placed one on each side of the supporting stakes, which keep them about two inches apart. As the shoots grow, they are placed between these wires and are thus well supported against the wind from any direction. No. 13 wire is sufficiently strong or No. 14, where two wires are used.

Another wire placed at between five and six feet from the ground is also used sometimes. This very much increases the cost of the trellis, which must be made stronger owing to its greater height and is not really necessary.

First and Second Years' Treatment. The vines are planted in the ordinary way, without stakes, and well cultivated to promote vigorous growth during the first summer. The object is to promote the development of a large and vigorous root system. For this reason, no summer pruning should be done, as it would limit root growth by diminishing foliage.

Soon after the leaves have fallen in the autumn, the vines are winter pruned (see Fig. 4). All growth is removed entirely except one cane and this is cut back to two buds. A light 3-foot stake is then driven on the leeward side of each vine. If most of the vines have made a growth of three or four feet, it is perhaps well to put up the trellis at this time. It can usually be deferred, however, until the following winter.

During the spring and summer, the young vine should be visited frequently and all the growth forced into a single shoot. This is accomplished by allowing only one bud to grow and tying the shoot which grows from this bud carefully to the stake. All other buds should be removed as soon as they start. (See Fig. 5.)

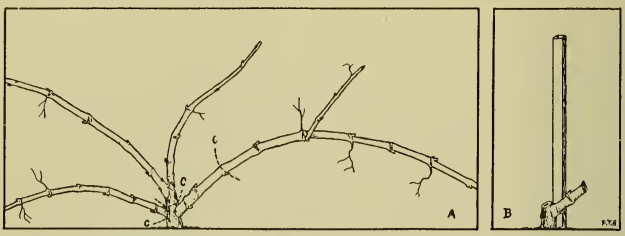

FIG. 4. Vine at end of first growing season. First winter pruning: *A*, before pruning; *c, c*, places for making cuts; *B*, after pruning and staking.

Third Year's Treatment. At the end of the second summer or growing season, the trellis should be erected, if it has not been done before. The vines will have to be pruned differently according to the amount of growth they have made. If they have been treated as recommended above, each vine will consist of a single cane with or without laterals. If this cane is vigorous, well ripened and long enough, it is tied along the bottom wire and cut off at the point where it reaches the bend of the next vine (see Fig. 6-*a*). Only perfectly ripened wood with good buds should be left. If the good part of the cane is not long enough to reach to the next vine it should be left as long as possible

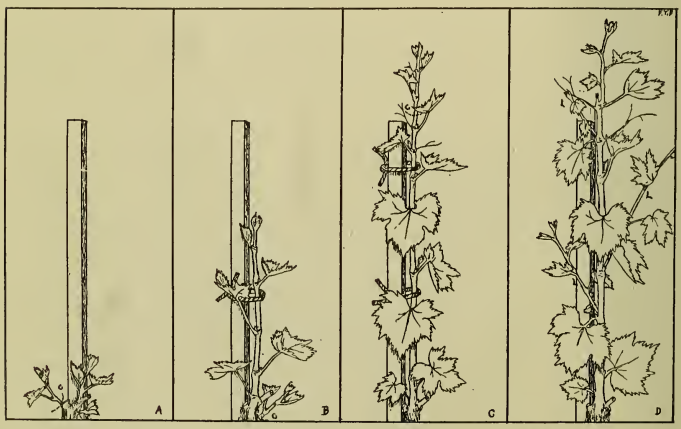

FIG. 5. Growth and treatment of the vine during the second season. *c, c,* Place where shoots are removed.

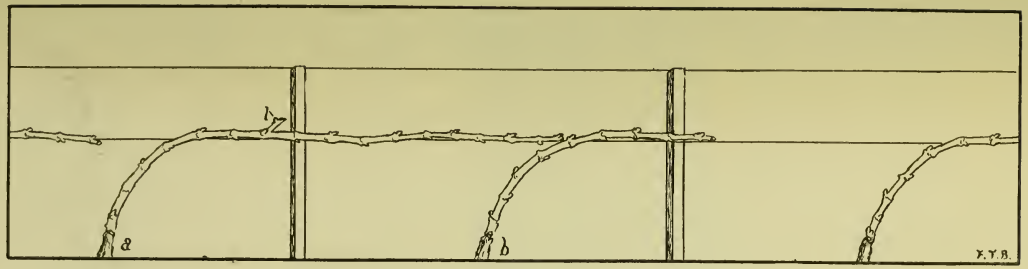

Fig. 6. Forming the cordon. Second winter pruning.

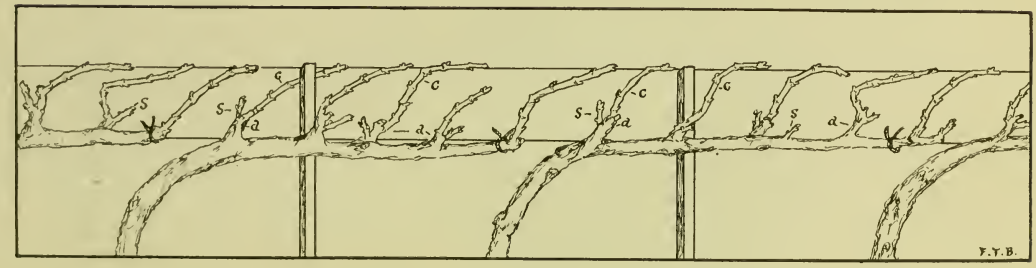

Fig. 7. Completed cordon (unilateral). Half-long pruning.

(see Fig. 6-*b*). If it is not long enough to reach the wire and extend at least one-third of the way to the next vine, it should be cut back to the two lowest buds near the ground, precisely as at the first winter pruning (see Fig. 4-*b*) and a new single cane developed during the following growing season.

In tying the cane, it should be brought from the ground to the wire in a gentle curve. A sharp bend should be avoided. All laterals on the cane should be cut back to one or two-bud spurs (see Fig. 6-*c*) and after the cane is tied to the wire, all the lateral spurs on top of the cane should be left and all others cut off. Those on top will develop into final arms of the cordon (see Fig. 7-*a*).

During the spring and summer, the vines should be carefully attended to with the object of developing arms along the top of the cordon and lengthening the cordon where necessary until it reaches the next vine.

Some of the buds will start earlier than the others and grow more rapidly into shoots. These will usually be near the end of the canes. As soon as these shoots have grown 12 to 18 inches, an inch of the extreme tip should be pinched off. This will delay their growth and force growth into the smaller shoots, and even start buds which have remained dormant. Shoots starting on the under side should be removed if there are enough to give a crop on the upper side. All shoots at and below the bend should be removed. Where the cordon is not of full length, a vigorous shoot near the end should be allowed to grow without pinching to form a cane to complete the cordon at the following winter pruning.

Treatment of the Completed Cordons. At the end of about the fourth growing season every vine should be a complete cordon, consisting of a trunk extending to the next vine and provided with arms on the upper side every 8 to 12 inches (see Figs 7, 8 and 9).

The pruning of the completed cordon will depend on the variety and on the vigor of the vine.

Fig. 8. Completed cordon. Short pruning.

Some varieties can be pruned to short two to three-bud spurs, one or two at the end of each arm (see Fig. 8). Most varieties which are suited to cordon pruning, however, require longer pruning. Emperor and Cornichon require half-long pruning. This consists in leaving a long fruit spur of four to six buds (see Fig. 7-*c*) and a renewal of spur of one bud at the end of each arm (see Fig. 7-*s*). Other varieties, such as the Ohanez, require still longer pruning. With these varieties, a fruit cane two, three or even four feet long is needed, together with a renewal spur on each arm.

Fig. 9. Completed cordon (bilateral). Half-long pruning.

With the Ohanez, according to the experience of Mr. Despessis in Australia, these fruit canes should consist of lateral growth. It is probable that this use of laterals would increase the bearing of other excessively vigorous varieties, such as some of the Persians, Rish Baba (Humphrey's Lady Finger), Paykani, Askari, Dizmar, and Hutab and perhaps of Persians 21, 23 and 24, which have given such excellent results in Imperial, except in the size of their crops.

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GRAPE SYRUP

The Possibilities of Production in California

BULLETIN No. 12

ISSUED OCTOBER 1, 1918, BY THE
State Board of Viticultural Commissioners

CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO
1918

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BULLETIN No. 12

BY THE STATE BOARD OF VITICULTURAL COMMISSIONERS
SACRAMENTO, CALIFORNIA

OCTOBER 1, 1918

The State Board of Viticultural Commissioners considers it advisable at the present time to give to the public information relating to the possibility of developing on a large scale the production of grape syrup in this state.

Such a course is deemed timely in view of the probability of national prohibition and the consequent destruction of the wine grape and wine-making industries of California.

There enters into the situation the question of the salvage of normally more than 400,000 tons of grapes, including many thousands of tons of second-crop table and raisin varieties that ordinarily have found their way to the wineries, but which, in the event of prohibition laws would not find such avenue of disposition.

The present season, because of early rains, has rendered large quantities of table grapes useless for shipment through the usual outlets, and in addition has caused considerable damage to the raisin crop.

It appears to this board, therefore, that there may be developed a means by which a part, if not all, of the crop might be saved in future years, providing a demand may be created for large quantities of grape syrup.

It is a well-known fact that syrup can be made from grapes. The undertaking prompts the following thoughts:

> Will it be necessary to market the finished product against the cheapest corn syrup commonly used?
>
> What will the effect be when conditions again become normal in the sugar market?
>
> How long would it take to create a market for 20,000,000 gallons of syrup?
>
> What would the cost of production of syrup be per gallon based on the payment of $15 or $20 per ton for grapes to the vineyardist?

What price per ton for grapes would make an inducement to the grower to retain his wine grape vineyard in a dry wine section, and in a sweet wine section?

Is it practical to work on the basis of producing an article to compete with a high grade syrup, such as maple, already on the market?

There is nothing novel about the idea of making grape syrup. It has been made in thousands of homes for many years, but the article has never been manufactured in an extensive or perfected way commercially, so that the whole consuming public might judge of its merit. The thought now is to make the best of an approaching situation which may bring great loss to thousands of people unless a plan is devised for taking care of a tremendous yield of grapes that heretofore has been made into wine in California.

With this thought in mind, the State Board of Viticultural Commissioners called a meeting in Oakland Tuesday, September 24, and endeavored to have present men whose ideas would be valuable on the particular subject of grape syrup. The following condensed report of the meeting and conference will be of interest to many at this time:

REPORT OF CONFERENCE.

There were present State Viticultural Commissioners Wetmore, Swett, Peterson, Bundschu, Stoll and Masson.

By invitation of the Secretary, the following named gentlemen were also in attendance.

Mr. John W. Lowe, California-Hawaiian Sugar Company, San Francisco.

Mr. W. E. Smith, Pacific Sugar Corporation, Tracy, Cal.

Mr. H. L. Kimball, Pacific Coast Syrup Company, San Francisco.

Prof. K. Sato, Japanese Imperial University, Tokio, Japan.

Toyoji Chiba, manager, and Toyoji Konno, secretary, Japanese Agricultural Association of California.

Prof. Frederic T. Bioletti and Prof. W. V. Cruess, of the University of California.

Mr. W. J. Shotwell, U. S. Food Administration Commission, San Francisco.

Mr. H. L. Maddox, secretary and manager, Sacramento Chamber of Commerce, Sacramento, Cal.

Mr. H. W. Rowley, California Fruit News, San Francisco.

Mr. Mihran K. Serailian, San Francisco.

In stating the object of the meeting, Secretary Sheehan said: "The viticultural industry finds itself confronted at this time with the problem of taking care of its damaged table grapes and its wine grapes. Because of legislation which is to be enacted by Congress, bringing about prohibition in the country on the first day of next July, and because of the tremendous damage done to table grapes in the northern part of the state, we are concerning ourselves at this time with the

subject of finding some sort of salvage for the crop of table grapes particularly. The wine grape crop is being taken care of by purchase for shipment in large quantities to Eastern markets, where black wine grapes particularly find ready sale.

"This board is charged with fostering and protecting all of the branches of viticulture and in compliance with the statute creating this department of the state government we are concerned in the welfare of the table grape man at this time. The rain damage affected particularly the northern section of the San Joaquin valley, the Sacramento valley and points north of Sacramento. A number of people in the table grape business find themselves possessed of grapes which are not marketable as such but which may have some value in other directions. There is quite a hazard in shipping East fruit that does not leave here in good condition.

"At Sacramento yesterday, a hurried meeting was called by the Chamber of Commerce. Professor Cruess, of the University of California, and representatives of the Japanese Agricultural Association were present and quite a lively discussion was entered into in relation to the salvage that might be gotten out of table grapes by converting them into grape syrup. Mr. Serailian, who has experimented largely in the making of grape syrup, was also in attendance at the meeting yesterday. These Japanese gentlemen present at this meeting are going to state to the board just what the plight of their people is in the vicinity of Florin and Elk Grove where grapes are so badly damaged that they are not marketable as table grapes. Owing to the probable doing away with wineries next July, whatever solution is found at this time will be valuable in the way of good for future years when similar conditions may prevail.

"I would ask the chairman to call on Mr. Maddox, of the Sacramento Chamber of Commerce."

Mr. Maddox: "Speaking of Sacramento and our plight up there, Mr. Sheehan has very ably set forth a brief report of our meeting yesterday. We are all pretty much in the same boat. There is a possibility that we may save something out of the wreck, and we are here to learn rather than to teach. Many thousands of cars of grapes are in the vineyards and if something can be worked out whereby the whole or part of them could be used as some sort of food product, it is possible that the Food Administration would be interested in that."

Mr. Sheehan stated that he would gladly offer the use of the plant of the Sacramento Valley Winery at Sacramento for experimental purposes along the line of making grape juice to be converted into grape syrup at the beet sugar factories later on but he did not possess the capital to go into this business himself.

Professor Cruess summarized briefly the work that has been done at the University and the work that is yet to be done by way of making grape syrup and putting it on a commercial basis.

"By adding sulphurous acid to the juice," said Professor Cruess, "it can be held for at least one year. We made some last year and it held perfectly in fifty-gallon lots. We have also worked out a method of removing the sulphurous acid so there is not a trace of it left and it does not injure the quality of the syrup. The acid could be removed by an equipment which could be easily installed in a sugar factory,

neutralizing, crystalizing and clarifying the juice. The syrup has to have about 65 per cent sugar to retain its keeping quality. The thing to be done is to demonstrate the feasibility of the process and to develop a market for the syrup. The beet sugar factories are not equipped with bone-black filters and it is very expensive to install them."

The chairman called on Mr. Serailian who said:

"I have tried for the last eighteen years to solve this problem on which we are talking now. I tried eighteen years ago to make grape syrup but have encountered all sorts of obstacles which I never thought of before. Professor Rising, of the University, experimented also along these lines, but the trouble is that the flavor has never been retained. If grape syrup is made without retaining the flavor it is objectionable. It would do for cheap trade, but it is too valuable a product to put on that basis. I have a process under which I can retain the flavor of every variety of grape in the finished product which will not only individualize each syrup but will make the people search for it. It is extremely pleasant to eat, so my experiment is equal to Professor Cruess' experiment so far as preparing the juice is concerned. When it comes to the finished product I use my own process so that I get the genuine flavor. If the grape is Tokay, the flavor in the syrup will be Tokay; if it is Zinfandel, it will be Zinfandel; if it is Alicante Bouschet, it will be Alicante Bouschet, and so on. I have also tried syrup from dried raisins, and it is excellent."

Mr. Konno, speaking for Mr. Chiba, of the Japanese Agricultural Association, spoke of the grape holdings of their members amounting to 40,000 acres in the state valued at $5,000,000, the table grape growers being largely in Sacramento, San Joaquin and Merced counties; the raisin growers in Fresno, Tulare, Kings and Merced counties and the Japanese wine grape growers owning vineyards in Sonoma County. He told of the plight of their members in the Florin and Elk Grove sections at the present time, saying they had 6,000 tons of Tokays on the vines, all badly damaged by the recent rains. Something must be done immediately by way of utilizing these damaged grapes or they would be a total loss. The making of wine under the circumstances was almost impossible—syrup making very possible, but the demand is uncertain. The drying of the grapes at the Horst plant had been considered, but weather conditions, the shortage of trays and other obstacles had been met. Professor Cruess had canned some of the damaged grapes as an experiment, and the U. S. Food Administration, the Japanese Consul and Ambassador, the University of California and the Viticultural Commission has been appealed to for help and advice.

The subject was discussed from all points but no definite solution was reached.

Mr. Shotwell said he was not prepared to give very much advice on the subject as he only knew of the meeting an hour before it was called to order. He said Mr. Konno had called on him a day or two ago and he went over briefly with him the possibilities and it appeared that there were several things that could be done that were feasible. The question of drying the grapes did not appeal as the weather may not prove favorable and a market may not be found. In connection with syrup making out of the present crop, the question would have to be

solved quickly as tankage would have to be secured and in the present wine condition the tankage might be available.

"As to the commercial nature of the syrup," said Mr. Shotwell, "there is a demand and will be a demand for at least three years to come for anything in the shape of sugar. Under existing conditions, there is a crisis in all sugar conservation and anything that will take the place of sugar will unquestionably command a good price at the present time. The great question is to produce the syrup commercially, and if that can be done I am sure a market can be found in some shape or another. As to the government taking it from you or making a price on it we would have to put the matter up to them before making an answer. I am sure that the Food Administration is more than willing to aid in any way it can."

The question of making wine for export to Japan was discussed but Mr. Chiba stated that the demand was for claret, which was used in Japan for medicinal purposes and that the people would not take the white wine made from the Tokay grapes.

Prof. Bioletti inquired if it would not be possible to find enough red grapes to blend with these Tokays to make claret.

Mr. Sheehan: "I do not think so. Practically all of the grapes moving out of California today are black grapes. The eastern maker of wine may buy these damaged Tokay grapes and other varieties in the Eastern markets at a less price than he is paying now for black grapes and will use these damaged grapes, coloring them up with the black grapes he is buying now to make wine."

Mr. Bundschu said that the grapes might be used for brandy making for other than beverage purposes.

The chairman called on Mr. Smith, of the Pacific Sugar Corporation, at Tracy.

Mr. Smith: "The matter of making grape syrup was brought up to us by Professor Cruess this morning. We considered the possibility of making this syrup on a commercial basis but our plans have been for a distant day and just a week or so ago the matter was taken up with our general manager, Mr. Eccles, of Ogden. He refused to discuss it at that time, but he left the impression that he thought the thing could be worked out very nicely. We will see him again this week.

"Professor Cruess stated that they have one-half million gallons of juice and asked us if we would estimate the cost of making this syrup. If it is possible to make this grape syrup without clarifying through bone-black the machinery of a beet sugar house is entirely adapted to the process. It can be put through the machinery of the beet house in the same succession as the beet juice itself is delivered at a relatively smaller cost. On a basis of 500,000 gallons of juice we estimated the cost of manufacturing this syrup. Our figures are only approximate. We figured that we could run this juice through in thirty days and our plant will be through its operations early in November."

Mr. Sheehan: "Would your plant entertain a proposition of buying these grapes at $15 per ton on the vines?"

Mr. Smith: "I do not think so. They would have to take their chances at a very small margin of profit."

Mr. Sheehan: "Would your company for the sake of experiment guarantee the growers $5 per ton and at a later date allow them to participate in the sale of the finished product?"

Mr. Smith: "It is impossible for me to state definitely as our manager did not give me any authority. A committee of our stockholders expects to be in California next week and we expect to put this matter before them. We will probably take this 500,000 gallons from Professor Cruess and make the experiment."

Mr. Swett: "Would there be any taste in a syrup made from damaged grapes?"

Mr. Cruess: "I do not know how dangerous that factor would be, as all the juice made so far has been made from perfect grapes from Davis."

Mr. Lowe, of the California-Hawaiian Sugar Company: "I believe that a grape syrup can be made and the only proposition is what it will cost to make the goods. I think if you are going to make a syrup it will have to be a syrup far more desirable than anything else on the market and if you could retain the flavor of the grape it would be far more desirable than any glucose syrup. Maple syrup is more desirable because of its own flavor and a grape syrup would be in the same class."

The chairman called on Mr. Kimball, of the Pacific Coast Syrup Co.

Mr. Kimball: "This proposition of making syrup of our grapes is one I have thought of for a long time. In my figuring I come up against this proposition—What is the least price that the grower can sell his grapes for and get a satisfactory profit on the crop? I do not know what that would be and I am taking just for a basis, $20 per ton. If the average percentage of sugar in these grapes is 20 per cent then we must figure that the sugar is costing 5 cents a pound right in the field. If you have 5 cents to start with and it is costing 10 cents a gallon to produce the juice, which is practically 1 cent a pound, your product is costing 6 cents a pound to start with at your sugar house door.

"Can you sell it with that cost as a basis?

"You have to sell it as a universal syrup, suited for all purposes, a syrup used by the factory, by the candy maker and in the home. It must be used as the base for other products and things must be added to it to give it the color desired. You will have to compete with corn syrup and commercial glucose. Under present conditions glucose or corn syrup is sold by the wholesaler in San Francisco at 5 4/10 cents a pound, against your product which we roughly estimate to cost 6 cents.

"If it is made for the table it must have some peculiar flavor for which the public will buy it as a table syrup. As every one in the syrup business knows, there is one syrup that is the standby for the American public and that is maple syrup. Everybody likes the maple flavor and there is no limit to the price the public will pay to get that syrup. Aside from that, the idea that you are putting out an article that is different from any other syrup and has a flavor and qualities of its own is something that will have to be largely advertised. The public does not like a strong characteristic flavor. Personally, I do not think a

syrup with the flavor of the grape would be acceptable to the trade. If the public took to it, it would be a seller; if it did not, it would not be. The question could be worked out by trying it. You have the glucose to compete with and the table syrups which are on the market today. This would be the year of all years to try it, because anything of a sugar nature can be sold. The syrup makers are restricted to 50 per cent of their requirements by regulation and it is also impossible to get containers in which to sell your syrup. The government is doing everything to restrict the use of tin. It can not be put out in bulk but it would have to go out in hermetically sealed containers. Paper pails would be the cheapest thing you could get.

"When we get down to normal conditions again you will be getting glucose at 3 cents or 4 cents a pound and then you have to compete with sugar and you have to compete with glucose. There are hundreds and hundreds of carloads of glucose sold on the coast suitable as a table syrup.

"Can you at the cost of producing grapes, compete with glucose?

Professor Cruess and Mr. Serailian each brought a number of samples of grape syrup and samples of fruit and berries preserved in grape syrup which were opened and tasted by those present.

Mr. Rowley, of the California Fruit News, was called on and spoke of the danger of giving out too much publicity on the grape syrup proposition until more was known of the feasibility of making a success of the product.

Mr. Sheehan, on behalf of the board, extended its thanks to all of the gentlemen who came to the meeting to enlighten the members on the subject.

After the conference adjourned, the members of the board discussed the subject further, and the consensus of opinion was that whatever plan might be attempted in the direction of producing grape syrup should have as its aim the development of a highly perfected product. The decoloring process was not considered of the same importance as the matter of retaining the flavors. The present evaporating machinery in possession of some of the wineries was considered available for some practical experiments, but not serviceable for the retention of flavors unless improvements were added to it. These additions would require some time and it was not considered possible to enter into practical demonstrations on a large scale during the present season.

There is information at hand indicating that before another season has approached, modern machinery made of aluminum or lined with silver and equipped with flavor-saving devices will be installed by local

and Eastern capital with a view of thoroughly testing the possibilities of a venture of the nature of grape syrup and grape extracts. Such undertakings will be encouraged in every way possible by this board.

Respectfully submitted,

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. WETMORE, President.

E. M. SHEEHAN, Secretary.

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California's Grape Industry

BULLETIN No. 13

ISSUED MARCH 1, 1919, BY THE

State Board of Viticultural Commissioners

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BULLETIN No. 13

BY THE STATE BOARD OF VITICULTURAL COMMISSIONERS

SACRAMENTO, CALIFORNIA

MARCH 1, 1919

This bulletin is issued primarily for the purpose of giving authentic information relating to the grape harvest and its products during the season of 1918.

The gathering of statistics was delayed because of somewhat unusual weather conditions affecting particularly the raisin production. Because of storms during the drying season for raisins much damage was done and much attention was paid to the matter of salvaging a very considerable proportion of the Muscat raisin crop. This effort meant that raisins were allowed to remain on the trays and in the sweat boxes until very late in the fall and the collection of these particular statistics had to be postponed until very recently.

It should be stated in a general way in prefacing this bulletin that troubles were encountered by the producers in all three branches of the viticultural industry: namely, table, wine and raisin grapes. Several untimely rainstorms occurred during the harvest of the table grapes and much tonnage that would otherwise have been packed and shipped as table grapes was not marketed as such and many carload shipments of table grapes sent out of the state were forwarded in small lug boxes instead of the usual crates and baskets. At the selling end it was difficult to ascertain with any degree of accuracy what proportion of the table grapes was bought for eating purposes and what number of crates was purchased for conversion into wine.

Shortage of shook. There was a shortage of table grape crates and baskets and much of the crop was loaded into refrigerator cars in lug box form. The grapes carried well under icing conditions, and, generally speaking, the returns to the growers were remunerative to a very

considerable degree. In a number of concrete instances, however, the grapes spoiled before they reached destination because of transportation delay due to priority rights that were required over the various railroads in the shipping of war munitions, etc. In such instances the grapes arrived at destination in soft and unmarketable condition but there was no trouble in selling them at profitable figures for wine-making purposes.

Raisin conditions. The production of raisins was considerably larger than ever before in the history of the industry in California. This was due to the tremendous crop in the Fresno and Tulare sections and in spite of the fact that the production in Sutter County in the northern part of the state was scarcely twenty-five per cent of normal. Frost early in the year did a great deal of damage to the vines and curtailed the setting of the fruit. Rains in the early fall did additional damage and the northern raisin section found its production reduced to but a small percentage of the usual crop.

Quality of raisins. In connection with the statement that the raisin crop exceeded all former years, it should be said that the great tonnage was composed of several classes and grades of raisins, including much damaged stock. The Muscat variety suffered most from the rains because they were on the trays and in the field in the sweat boxes when the storms came early in October. There was no chance of salvage through the wineries locally because federal regulations prevented the manufacture of commercial brandy and even fortifying brandy was limited in production because of the very small sweet wine output and the large government tax attached to its production and sale. Raisin growers, therefore, devoted their time to either drying artificially or to turning the raisins on the trays frequently in an endeavor to prevent the molding and rotting of the Muscat raisins. To a considerable extent they were successful, but after the raisins were delivered to the packing houses there was much more work to be done in the way of grading, and even at the present writing this is not finished.

Luckily, California raisins of both good and poor grades have had their own way in the United States market and no matter what the damage was the prices were high and the goods were eagerly bought at prices that yielded handsome profits to the growers.

Conditions surrounding wine grape crop. The wine grape crop throughout the state brought unheard-of prices, and when the grower thought he was not receiving high enough figures locally he had an opportunity of dealing with brokers and dealers who represented Eastern purchase sources. A very considerable proportion of the wine grape crop was moved out of California to other states of the Union where it was converted into wine. We estimate the number of cars of wine grapes so transported to have been 6,000 cars, and prices realized

by the shippers probably averaged to them at the shipping point $35 per ton. In localities where wine grapes were under contract the purchaser eventually raised the contract price from whatever it might have been to a figure of $22.50 per ton and from that point upward. Sales to the local wineries ranged from $25 per ton in sweet wine districts to $50 per ton in dry wine districts. The California production of wine, however, was curtailed because of the probable approach of federal war-time prohibition and the sweet wine output was less than one-fourth of the normal amount manufactured annually. Dry wine production almost equalled the normal, but this was due to the fact that many of the sweet wine wineries decided to convert their entire crop of grapes into dry wine on account of the large federal tax required in the production and in the marketing of sweet wines and because of fear on the part of the producers that the high selling price of sweet wine might act by way of curtailment of the sale.

At the time of issuance of this bulletin war-time prohibition of the manufacture of wine is in effect to all intents and purposes, even though the date of the prohibition of manufacture is May 1 of this year. Prohibition of the sale of wine for beverage purposes (except for export) will be in effect on July 1 of this year and until such time as demobilization of the troops shall have been proclaimed by the President of the United States. The date on which such proclamation may be made is problematical. If it should occur at any time between the present and the opening of the vintage season next September the wine grapes of California could be crushed and made into wine and sold up to the time that national prohibition under the Sheppard amendment to the federal constitution takes effect. This date, according to the proclamation issued by Acting Secretary of State Polk, is January 16, 1920. If that date stands against legal contentions which will be made to overthrow it, as well as to overthrow the war-time prohibition bill, the nation will be under a prohibition law after January 16, 1920, and use of all forms of alcoholic beverages will be prohibited.

The news comes during the preparation and publication of this bulletin that concerted legal action is to be started in many of the states of the Union looking toward testing the constitutionality of the wording of the prohibition amendment, as well as the right of the people of some fifteen states having referendum laws to approve or disapprove of the action of their legislatures in adopting resolutions ratifying the national prohibition proposal. Whether success or failure will attend this legal effort is a question of doubt at the present time, and yet it is not having a deterring effect on the interests that are concerned in saving their properties from destruction, as well as on a large number of people in the various communities who are opposed to the principle of depriving them by law of personal liberties granted by the federal constitution.

If the Supreme Court of the United States should decide that the right of referendum is applicable in the several states which have a referendum law, then the realization in the country of prohibition and the application of the national prohibition law would be delayed a year or two until all states which have in effect the referendum would have submitted the subject to the vote of their people. The referendum, therefore, if applicable, would delay prohibition under the Sheppard national prohibition amendment for possibly two years, or until such time as thirty-six states either through their legislatures or by referendum vote had ratified the national proposal.

Pruning and caring for wine grape vineyards. During the past three months many growers of wine grapes have written this department asking what they should do about caring for their vineyard properties for another season. The question is a difficult one to answer and invariably we can only ask such growers to form their own conclusions after we give them a statement of facts. This board would not and could not give any sort of guarantee to the wine grape grower as to whether he could harvest his grapes next season and get a profitable price for them. If the manufacture of wine were permitted, we would not hesitate to say that all wine grape vineyards should be cared for with a certainty that the crop would bring a satisfactory price. If the manufacture of wine is prohibited the coming fall and the grape growers are not released by the demobilization proclamation we can not say how much of the crop could be disposed of for other purposes or what price would be paid.

Other uses for wine grapes. It is possible to make out of wine grapes unfermented grape juice and grape syrup. The manufacture of such articles has been in effect in a limited way in California for a great many years, but the products have not proven a success commercially to any considerable extent. Unfermented grape juice not to exceed 100,000 gallons during any season has been manufactured, but it is a small item as compared with the wine production out of the same character of grapes and there has not been a lucrative market at any time for California unfermented grape juice.

The making of grape syrup for table use has been confined almost exclusively to some of the households in the state and no one has attempted as yet to exploit this product commercially and in an extensive way. Such an enterprise might be undertaken, but if we should look to the disposition of all of our wine grapes in the finished form of syrup we would have to figure on disposing of some 20,000,000 gallons annually. It could not compete in point of cost of production as a sweetening power agent with either cane or beet sugar. Neither could it compete in point of cost of production with the ordinary corn syrup used in the household. It could be offered as a table syrup in com-

petition with such syrups as maple, and if the public readily accepted grape syrup as it does maple syrup there would be some opportunity to make it a commercial success in a limited way through publicity and educational campaigns.

This board has attempted with scientific advice and practical experiments to produce out of the wine grape an article that it could guarantee a commercial success, but it has not been able to reach a conclusion which would justify the statement that the wine grape crop of the state could be saved by other means than converting the raw material into wine. If at any time a discovery to the contrary should be made, either by its efforts or by the efforts of others, the information will be promptly conveyed to the general public.

The viticultural commission, in co-operation with the viticultural division of the State University, has been conducting experiments with the idea of producing a commercial article from wine grapes which might be more readily salable than either the unfermented juice or grape syrup. The manufacture of unfermented grape juice is no secret. It has been made in California for many years, but up to the present time those engaged in the business have not done so extensively because there has been no great demand for the unfermented California article. It is also known that syrup can be made from grapes, but up to the present time nothing extensive in a commercial way has been undertaken in the production of grape syrup. There are some who believe that the idea is fraught with great possibilities, and this remains to be seen.

This board looked with favor on the idea of producing a product from grape juice which might afterward be converted into either unfermented grape juice or grape syrup, and it authorized, in co-operation with the university, a work of experimentation in the northern part of the state. It was sought to produce an unfermented juice in powdered form, and after experiments lasting several weeks the work was dropped because it was agreed to be a commercial failure. The grape juice in powdered form was produced, but the powder melted and adhered to the walls of the retort, compelling those who were experimenting to come to the conclusion that such production was out of the question. Work in a similar direction is now going on looking to the production of an anhydrous (water-free) molten syrup which could be run into barrels and sealed. The alternative in the way of dehydrated juice would be a product made in a continuous vacuum evaporator. Tests along this line are also to be made and if any of them should prove to be successful the results will be announced to the public.

Many growers of wine grapes, with the hope of saving their vineyards in the event of complete prohibition, are looking to the possibilities of

artificially drying wine grapes in sections of the state where drying by natural, or sun, process is out of the question because of climatic conditions. This board is fully investigating the artificial drying plants of several people who claim to be possessed of improved methods, and whatever is obtained in the way of information will be given to the public in a later bulletin on this special subject.

OHANEZ (ALMERIA) AND BLACK ZANTE PLANTINGS.

Over a year ago we distributed to twelve hundred applicants scattered in almost every section of the state cuttings of the Ohanez (Almeria) table grape and the Black Zante currant. At the time we gave explicit planting directions, but explained to those who applied that there were probably many sections of the state in which either or both varieties could not be cultivated successfully. We desired, however, a practical as well as an extensive experiment.

Last fall we sent printed forms to all of the applicants asking information in relation to the plantings. In many instances failures were reported, but in a larger number of instances the cuttings took root, threw out canes and gave evidence of considerable thrift. We sent to each person experimenting directions in relation to pruning these new vines and we intend to follow this experimental work along through a succession of years, at the end of which time we shall know in a definite way what sections of the state are suitable to the cultivation of these two comparatively new varieties of grapes.

DRY WINE PRODUCTION FOR 1918.

The dry wine production in California during the 1918 vintage season was 25,000,000 gallons, which is equal to a normal production.

Of this production there was a falling off of the usual or normal amount produced in the sections of the state primarily known as dry wine sections, but the average was more than made up by an unusual production in some of the sweet wine sections.

Nineteen million gallons of dry wine were made in the counties of Mendocino, Napa, Sonoma, Contra Costa, Santa Clara, Santa Cruz, Sacramento, Solano, San Joaquin, Fresno, Alameda and San Francisco.

Six million gallons of dry wine were manufactured in San Bernardino, Los Angeles and San Diego counties in southern California.

This total production of 25,000,000 gallons called for the use of nearly 170,000 tons of grapes.

On a basis of $35 per ton this tonnage of grapes made into dry wine brought the growers $5,950,000.

SWEET WINE PRODUCTION IN 1918.

The sweet wine production in the state fell off from a normal of 18,000,000 gallons to 4,168,240.63 gallons of all varieties.

The production by counties and varieties is as follows:

County	Port, gallons	Sherry, gallons	Angelica, gallons	Muscat, gallons	Tokay, gallons
Fresno	629,941.60	362,595.96	286,402.04	61,988.95	26,006.05
Kings	----------	52,370.59	----------	87,643.23	----------
Los Angeles	28,853.91	43,324.86	6,653.73	7,761.61	----------
Madera	71,597.79	92,976.30	31,472.29	----------	----------
Merced	106,776.13	106,576.38	----------	----------	----------
Sacramento	98,918.67	141,783.01	----------	----------	----------
San Bernardino	212,232.41	76,258.93	----------	----------	----------
San Joaquin	728,247.13	706,086.63	94,926.95	21,812.19	----------
Sonoma	----------	----------	3,430.57	2,793.73	----------
Tulare	50,569.26	----------	16,826.39	11,411.34	----------
Totals	1,927,136.90	1,581,972.66	439,711.97	193,413.05	26,006.05

	Gallons
Port	1,927,136.90
Sherry	1,581,972.66
Angelica	439,711.97
Muscat	193,413.05
Tokay	26,006.05
Total	4,168,240.63

This total production of sweet wine for 1918 meant the use of 55,570 tons of grapes, which at an estimated average price of $25 per ton, brought the growers of the grapes $1,339,250.

Six thousand cars of wine grapes shipped out of the state meant 90,000 tons of grapes, and at an average selling price of $30 per ton at the shipping point brought the growers $2,700,000.

The total returns to the wine grapegrowers of the state for the vintage of 1918 for the grapes loaded at the shipping points was $10,039,250.

The estimated prices per ton received are conservative and probably low. It will thus be seen that the production of wine grapes in the state in 1918 was 315,570 tons.

BRANDY PRODUCTION.

The production of brandy in the state from the vintage of 1918 up to January 1, 1919, was in the neighborhood of 1,000,000 proof gallons, but it is not a factor in the estimate of the value of the wine crop because practically all of it was made for fortification of sweet wines and used immediately in the manufacture of the sweet wines.

It should be stated in connection with the wine data that the price of wines advanced in proportion to the price of grapes, and this was due to a healthy demand at all times for both the sweet and the dry wines

of this state. The price realized at the present time for these wines is higher than was ever known before in the history of the state. Limited production, shortage of old stocks almost to depletion and an unusual demand on the part of the public, the falling off of imports and the stimulation of exports were the factors in bringing about high prices for all wines.

Tax returns on 1918 vintage. The government tax in the production and in the sale of the 1918 vintage of wine would amount at the present tax rates to approximately $3,140,000. That portion of the production which yet remains unsold and which is subject to taxation at the double rates of the new revenue bill would increase the aggregate tax money collected by the government approximately $1,500,000 for one season's production of California wine.

FEDERAL INCOME TAX AS RELATING TO WINE GRAPE VINEYARDS AND WINERIES.

It will be of interest to wine grape growers and to owners of wineries to know that the new revenue bill will take into consideration the possible depletion feature connected with losses that may have been sustained by such persons by reason of the effect of federal prohibition. This very subject was taken up with the government by this board and the revenue bill contains amortization and obsolescence features which are presumed to apply to properties affected by the war or by national legislation. Ordinarily in the income and excess profits reports a normal depreciation charge only is allowed, but the new revenue bill takes into account the possible complete destruction of property within the year and one of the interests that will be concerned is viticulture in California, and, to a small extent, in other portions of the United States.

It would appear from the new legislation on the subject that the wine grape vineyardist and the owner of a winery would have the privilege of a reasonable amortization charge against his investment in improvements, such as buildings, machinery and vineyards for the year 1918 and a similar charge against the same property when he makes his report for the year 1919, providing, of course, it is demonstrated that federal prohibition has caused the complete destruction of his investment.

The particular portion of the revenue bill which would indicate that this special calculation is permissible is as follows:

> *Art. 160. Loss on inventory by obsolescence or damage.* No deductions from the inventory value of merchandise or material will be allowed except in cases in which the inventory includes goods or materials which by reason of obsolescence or damage are unsalable. When such deduction is claimed the facts connected

therewith, including a statement of the cost of the goods, the value at which they were inventoried, and their present condition, must be filed with the return.

Art. 178. Obsolescence deductible, cost less depreciation and salvage. Amounts representing losses on account of obsolescence of physical property may be included as a deduction from gross income as a loss, provided such amounts have been recorded in the books following the condemnation and withdrawal from use of the obsolete property. The amount of obsolescence that may be claimed as a deduction shall be ascertained by deducting from the cost of the property the total amount that has been previously claimed and deducted on account of the depreciation of the property, plus the residual value at time of obsolescence, or plus the amount received for the sale of the property. The obsolescence deduction must not include the accumulated depreciation applicable to prior years.

Art. 179. Obsolescence when no depreciation is deducted. If no depreciation has been charged off against such property and deducted from gross income of prior years, the amount allowable as a deduction for the year in which the property becomes obsolete shall be ascertained by deducting from the cost of the property its residual value plus an amount equal to the depreciation actually sustained during the prior period and which might have been deducted when computed at the rate applicable to the same or similar property. The amount of depreciation thus arrived at as applicable to former years may be made the basis of amended returns and a claim for the refund of taxes overpaid by reason of the fact that no depreciation deduction was claimed in those years.

RAISIN PRODUCTION IN 1918.

The production in the state segregated by varieties and by counties is given in the following tabulation:

Counties	Muscats, tons	Thompsons, tons	Sultanas, tons	Sundries, tons	Total, tons
Fresno	82,000	37,500	6,500	3,500	129,500
Kings	8,750	600	650	----------	10,000
Tulare	9,000	7,500	4,000	250	20,750
Kern	1,300	550	----------	----------	1,850
Madera	900	250	50	250	1,450
Stanislaus	----------	600	50	----------	650
Sutter	----------	1,250	----------	----------	1,250
Yolo	----------	300	----------	----------	300
San Bernardino	275	----------	500	----------	775
San Diego	250	----------	----------	----------	250
Merced	25	200	----------	----------	225
Total tonnage	102,500	48,750	11,750	4,000	167,000

The prices realized by the growers of raisins on the basis set by the United States government of $5\frac{1}{2}$ cents per pound for Muscats, $6\frac{3}{4}$ cents

per pound for Thompson's Seedless, 6½ cents per pound for Sultanas and an estimated price of 4½ cents per pound for sundry raisins netted the growers an aggregate sum of $19,743,750.

To arrive at the net profit of the growers of raisins there should be deducted from this aggregate figure the harvesting expense, the cost of drying and the care and cultivation of the vineyards. If untimely rains had not interfered with the raisin production and damaged a large quantity of the product the yield of raisins in California would probably have exceeded 180,000 tons.

The product was sold to good advantage and there was practically no competition from imports of raisins or currants.

TABLE GRAPE PRODUCTION.

Absolutely accurate figures as to the number of carloads of table grapes produced in California and sold as such are not obtainable. A systematic investigation at many shipping points and a thorough checking of carload shipments in the general offices of the Southern Pacific, Santa Fe and Western Pacific railroads discloses the fact that a total of 18,189 cars of grapes were loaded in refrigerator service for transportation out of the state. Of this total number it is estimated that 6,000 cars were wine grapes shipped and sold as such, leaving 12,189 carloads of table grapes sent out of the state. It is generally estimated that 1,000 cars of table grapes are consumed in California or sent out of the state in small express shipments; so, therefore, the most intelligent estimate we can make of the number of cars of table grapes produced in the state is 13,189 cars.

The estimated average price received by the grower for a carload of grapes packed and loaded at the shipping point is $1,250. On this basis table grape growers received for their table grapes $16,487,250.

From this total received for table grapes must be deducted the cost of harvesting the crop, the cost of the crates and the packing charges and the attendant expense in connection with the care of the vineyard.

The viticultural industry in the state in all three branches has, therefore, brought to the producers of the grapes the annual income of $46,220,250 for the year 1918.

Respectfully submitted.

STATE BOARD OF VITICULTURAL COMMISSIONERS,

C. J. Wetmore, President.

E. M. Sheehan, Secretary.

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Possible Uses for Wine Grape Vineyards

BULLETIN No. 14

ISSUED MAY 20, 1919, BY THE

State Board of Viticultural Commissioners

IN CONNECTION WITH THE

Division of Viticulture, University of California

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BULLETIN No. 14

ISSUED BY THE

STATE BOARD OF VITICULTURAL COMMISSIONERS

SACRAMENTO, CALIFORNIA, MAY 20, 1919

POSSIBLE USES FOR WINE-GRAPE VINEYARDS

By Frederic T. Bioletti and W. V. Cruess.

There are about 170,000 acres of wine-grape vineyards in California. The cost of establishing these vineyards, exclusive of the land, has been over $25,000,000. The product for 1918 returned to the growers over $10,000,000.

The prohibition of the use of grapes for wine-making threatens the total loss of all this value. To this loss must be added the cost of the removal of the vines before the land can be used for other crops. This alone will amount to about $2,000,000. All methods which offer any hope of preventing even a portion of this loss are worth considering. In a few cases the salvage may be considerable; in others, all that can be done is to avoid increasing the loss by unwise or unskillful attempts to utilize the crop or to change it.

The methods proposed and listed here are of four types: (*a*) Shipping the fresh grapes to countries which do not prohibit wine-making; (*b*) utilization of the grapes for other purposes than wine-making; (*c*) grafting the vines with raisin and table varieties; (*d*) replacing the vines with other crops.

A. SHIPPING THE FRESH GRAPES.

In 1918 six thousand cars of wine grapes were shipped out of the state and brought to the growers about $2,700,000. These grapes were shipped to eastern parts of the United States, where they brought good prices. These shipments might be continued and even increased if individuals were permitted to make wine for their own use as with cider in Maine. This possibility, however, is doubtful. A small amount might be disposed of in a similar way in Mexico. Shipment of wine grapes to greater distances is impracticable with our present methods,

so that there is little hope of utilizing any considerable portion of the crop in this way.

B. USE OF THE GRAPES FOR OTHER PURPOSES.

1. *Drying and Evaporation*: In the raisin districts (the interior), the wine grapes can be sun-dried by the methods in use for Muscat and Sultanina. In the dry-wine districts (the coast counties), they can be dried in evaporators.

In 1918, about 4,000 tons of sun-dried wine grapes were produced in California and sold for an average price of over 4½ cents, in some cases bringing higher prices than raisin grapes. Experiments by the College of Agriculture with eleven varieties of wine grapes indicate a slightly better drying ratio for wine grapes than for Muscats. In 1916, with an average sugar content of 25.2° Balling, 3.13 pounds of fresh grapes yielded one pound of dried; in 1917, with 22.21° Balling, the same varieties yielded at the rate of 3.68 pounds of fresh to one of dry. At 4½ cents per pound for the dried grapes, and allowing $15 per ton for harvesting and drying, this represents a price of $14.45 per ton on the vines for fresh grapes at 23° Balling.

Wine grapes of some varieties, especially the white, such as Palomino and Feher Szagos, yield a dried product that is of fair to good quality for use in cooking. Most varieties are of poor quality for this purpose. It is probable that most of them are used in wine-making. Sweet wines of good quality can be made from them. For dry wines, they are less suitable, as the red color is destroyed and the wine has a "rancio" or "sherry" taste.

Sun-drying is impossible in the dry wine districts because the grapes ripen too late and the air is not sufficiently hot nor dry. Drying in evaporators, however, is possible by the methods used in the Sacramento Valley in the production of Sultana raisins. These methods consist of dipping the grapes in a hot solution, to check the skins, and then drying in a tunnel or other form of evaporator. Directly after dipping the grapes are often sulfured. Moderate sulfuring would probably be advisable with wine grapes.

Grapes have been dried in this way for $15 to $20 per ton of dried product, reckoning neither harvesting nor hauling. The cost is somewhat higher than that of sun-drying. The quality, however, for most of the purposes for which dried wine grapes would be used would be higher. When properly dried in an evaporator the red color is retained to a great extent and grapes raised in the coast counties and dried in this way would be much superior to sun-dried grapes for making dry wine.

As a gallon of wine could be made from about four pounds of dried grapes, they would have to be sold to the wine-maker for 6 cents or 7 cents per pound to compete with fresh grapes in wine-making regions

under ordinary conditions. In regions where wine grapes are not raised, as in most parts of the United States, they might bring nearly twice this price.

Experiments by the College of Agriculture indicate that dried grapes form an excellent food for hogs, if used in moderation. For this purpose they have about the same value as rolled barley. This represents a price, however, which would not pay the cost of production. If we allow a minimum cost of drying of $15 and a maximum yield of 3⅓ pounds of fresh grapes to one of dry, a price of $40 per ton to compete with rolled barley would yield the grower only $7.50 per ton for fresh grapes delivered at the dryer.

2. *Grape Syrup*: The possibility of the manufacture of grape syrups of several kinds and of excellent quality has been abundantly demonstrated. The only doubt at present is whether a market can be developed for these syrups in time to save the vineyards and whether the consumer will pay a sufficient price to yield a profit on the growing of the grapes and the manufacture of the syrup. If the syrups have to compete on the score of price with syrups made from cane, beets, or sorghum, this is extremely doubtful. As some of the grape syrups, however, have valuable qualities not possessed by others, it may be possible to obtain a remunerative price on the score of quality.

Two general types of syrups have been made: (*a*) Those in which little of the grape flavor is left. These are called neutral-flavored syrups. (*b*) Those which retain as much as possible of the special flavors of the grapes. In each of these general types we have subtypes according to whether the color is white, red, or various shades of brown or yellow. These variations of color depend on the method of manufacture and the kind of grape. Other variations are introduced by the more or less complete neutralization of the natural acidity of the grapes.

The uses of these syrups will vary with their character. The neutral syrups will be used for the same purposes as the ordinary syrups with which they will come in direct competition. Only when the prices of these syrups are abnormally high is there any possibility of marketing neutral grape syrups at a paying price.

The syrups which retain more of the characteristics of the grapes, however, may find a special outlet of their own at higher prices.

Many consumers prefer the syrups with a full grape flavor, while the acidity and red color are attractive to others. The acid and red grape syrups are especially promising for use in making summer drinks, candies, ice cream flavoring, and various confections.

The processes of manufacture are as various as the kinds of syrup.

Sorghum Pans: The simplest method of making grape syrup is by means of shallow open pans heated by direct fire or steam coils, such as are used for sorghum, cane, and maple syrup. This method has been used successfully and profitably on a small scale in California. A con-

lowest temperature used the dried product was melted, forming a syrup. On cooling to room temperature, this syrup solidified to a glassy mass. This solid mass quickly absorbed moisture from the air and became a syrup. If sealed in air-tight containers while still dry and solid, it would undoubtedly keep perfectly. It occupies a very small volume, is readily soluble in water, and forms a syrup of better flavor than that produced by the ordinary vacuum pan. It is without a scorched taste and the color is retained.

A large milk evaporator would handle about 6,000 gallons of juice a day. The evaporating chamber would have to be lined with tin because the acids of the juice would rapidly attack the usual zinc lining. It would also probably be necessary to surround the evaporating chamber with a low-pressure steam jacket to melt any dried juice which might adhere to the walls.

The process could be modified to produce a syrup directly or the dried product could be packed and made into a syrup as required. The syrups are of excellent quality and flavor and may be red or white, according to the juice used.

Other Processes: Other processes are in use for the evaporation of solutions by means of a current of air. In some cases, the air is heated. In others, the liquid is heated on a revolving drum exposed to a current of air. In others, the liquid is sprayed through a revolving atomizer against the inner walls of a cylindrical chamber heated by a steam jacket. The last method is said to have been used successfully in France in the production of grape syrup.

Mr. Forsyth of Gilroy states that he has made sorghum syrup of good quality by allowing the juice to flow over wooden baffles against a blast of heated air. The baffles are placed one above another in an enclosed tower. This method could probably be used with grape juice.

Cost and Returns: No accurate calculations can be made of the cost of manufacture on the basis of the small tests made. An estimate of the probable cost, however, can be made from the published costs of the manufacture of cane and sorghum syrup and from what is known of the cost of crushing and pressing grapes.

Cost Per Gallon of Grape Syrup.

Crushing, pressing, filtering	$0 03
Evaporation, storage, canning	12
Cans, labels, boxes	25
Grapes, at $17.50 per ton	32
Total	0 72

This represents the cost of the syrup in cans and boxed for shipment at the factory. To this must be added transportation, commission and profits of wholesaler and retailer. With these added, the price to the consumer would undoubtedly be higher than for common syrups, but not high for syrups of the *special* qualities and adaptation to the many

special uses that characterize grape syrups. The *special* syrups containing the color, flavor, and acidity of the grape would be most easily and cheaply prepared and would be most likely to attract *special* consumers and to command higher prices.

In the production of some of the types of syrup described, the cream of tartar would be recovered as a by-product and would decrease the net cost.

3. *Grape Juice*: There have been numerous attempts to manufacture and market grape juice from California grapes during the last twenty years or more. Most of these have failed entirely. A few have had a moderate and momentary success. Before making new attempts, the causes of previous failures should be studied.

Some of the failures were due to neglect of the first principles of food preservation. When the details of an industrial process have been well worked out, the "rule-of-thumb" man may be successful. In establishing a new industry, the theoretical bases of the processes must be understood if a correct practice is to be devised quickly. While the scientific facts on which the manufacture of grape juice in the Eastern states is based are the same as those which must govern its manufacture in California, the details of practice may be different.

Other failures were due to the use of inferior raw material. Only good grapes will make good grape juice. Grapes without flavor will make an insipid juice; moldy grapes will communicate their unpleasant flavors. Good grape juice can not be made from the culls of wine, table, or raisin grapes.

Other failures were due to the attempt to make the juice too cheaply with a consequent sacrifice of quality.

That grape juice of the highest quality can be made from suitable California grapes by appropriate methods is proved by the grape juices exhibited at the Panama-Pacific International Exposition. Those which won the chief awards were better than anything of the kind that can now be found on the market whether made from California or Eastern grapes. To establish a market for such juices is a problem similar to that of establishing a market for fine wines. To be produced profitably, they must bring a higher price than common juices, owing to the scarcity and higher cost of the fine varieties of grapes needed and to the extra expense of the careful and skillful manipulation necessary in their manufacture. A market could be established only slowly and by constant emphasis on quality rather than cheapness. They must attract the connoisseurs who determine the purchases of the consumers of luxuries.

A grape juice, to please the consumer, must have certain qualities of flavor, acidity, and color. The Eastern grape juices most commonly found on the market depend for their popularity on their strong "Labrusca" or "Concord" flavor. This flavor is so strong that it

covers up many defects of flavor such as those due to overheating, oxidation, or imperfect condition of the grapes.

None of our California grapes, with the possible exception of the Muscat, have so pronounced a flavor as the Concord. Their flavors, however, in many cases, are varied, delicate, and delicious to the discriminating palate. Very few would prefer the Concord juice to that of the Semillon, the Colombar, the Riesling, and of many others as they come fresh from the press. The problem is to present the juice to the consumer with these flavors as little changed as possible. That the Concord flavor is not of itself more pleasing to most people than that of the best California varieties is easily proved by tasting the juices of each before they have been changed by unskillful manipulation. The great majority of tasters under these conditions prefer the flavor of the California grapes and of their juices.

The high acidity of Concord juice is one of its valuable qualities. Many consumers, however, prefer the lower acidity of the California grape juice, especially when, by skillful preparation, the fresh flavors of the grapes have been preserved. Moreover, by a judicious choice of varieties and degrees of ripeness California grape juices can be produced with high acidity.

Preference of color is a matter more of habit than of taste, and any desired color can be obtained from our grapes.

If the manufacture of grape juice in California is to be a commercial success it must be based on the intrinsic qualities of the grapes and not on an attempt to compete with Eastern grape juice which appeals to a different taste.

It would probably be necessary to produce several types of juice to satisfy different tastes and to utilize our available grapes.

Muscat juices, characterized by the marked Muscat aroma, would appeal to those who prefer strong flavors. They can be made red or white and with varying degrees of acidity by blending with acid and red wine grapes. This type would require the least care and skill to produce and could therefore be made more cheaply. It has been found possible at the station to preserve white Muscat juice in cans. It is the only kind of juice made which would be likely to succeed in pleasing the consumers of Concord juice. It probably would not be relished by those who could appreciate the finer flavors of our best wine grapes. It would be particularly suited to use in cooking and preserving and could be sold at a relatively low price. Red juice loses its color in tin cans.

It is probably hopeless to attempt to market a juice made from our common varieties of wine or table grapes. These are better suited for drying or for syrup. From our fine varieties of wine grapes, however, juices of the highest quality can be made. But to make them requires both skill and judgment. Methods which may be adequate for Concord or Muscat would fail with Semillon or Riesling. We must make our

fine grape juices with the same ideals which controlled the manufacture of our fine wines. They require the same careful choice of varieties and localities and the same degree of careful manipulation. They will attract the same class of discriminating consumers and will necessarily require higher prices. Grapes grown in the dry-wine districts will give the best results. The varieties most suited for this type of juice are in the main those which centuries of experience have shown to be most suited to the production of fine wines, especially those of an aromatic nature.

Of the varieties grown in California, the most suitable probably are Semillon, Colombar, Riesling, Traminer, Palomino, and Cabernet. Varieties high in color and acidity, such as West's White Prolific, Barbera, Rofosco, Crabbe's Black Burgundy, and St. Macaire, might be useful as blends to give variety. Whether fine wine grapes of neutral flavor, such as Pinot and Petite Sirah, would be suitable is doubtful. The commoner wine grapes, such as Zinfandel, Carignane, Mataro Bouschet and Burger, are undoubtedly unsuitable.

By carbonating the finer grape juices they could be improved for most tastes. The carbonic acid not only increases the freshness of the juice but brings out the special flavors. It makes it possible to prepare the juice at lower temperatures which also tends to conserve the more delicate flavors.

Cost and Returns: Estimates of cost will vary according to the kind of juice which is contemplated. Based on small-scale tests at Davis, the cost of canned Muscat juice would be about as follows:

Cost Per Quart Can.

1. Grapes at $20 per ton	3.1 cents
2. Crushing, pressing, filtering, canning, and pasteurizing	2.0 cents
3. Cans and labels	4.0 cents
4. Packing	2.0 cents
Total cost, f. o. b. factory	11.1 cents

It should be possible to sell this juice to the consumer for a price of 20 cents to 25 cents per quart can.

The cost of the juices of finer quality would be higher on account of the higher cost of the grapes, the more skill and labor necessary in manufacture, and the necessity of using bottles. The grapes can not be grown profitably at less than about $30 per ton and it would probably be necessary to obtain from the consumer a price at least 50 per cent higher than that estimated for Canned Muscat Juice.

4. *Vinegar*: Wine or grape vinegar is the standard in grape-growing countries and is considered the best and commands the highest price in most others. Its only serious competitor on the score of quality is cider or apple vinegar. It differs from the latter in higher flavor and greater strength. Its reputation is not high in California, owing to the fact that it has usually been made from spoiled wine by unskillful methods.

When made from good material by proper methods, it is as good here as in France. It should be clear and of clean taste. A good grape vinegar should contain about 8 per cent of acetic acid, which is twice the legal standard. It therefore can be used as economically as ordinary vinegar, even though bought for double the price and its high quality is a net gain.

To make good vinegar, sound, ripe grapes must be used. Any of our wine grapes are suitable. These grapes must be handled and fermented as carefully as in making good wine. In fact, the first step in the making of good vinegar is to make good wine. This wine is then changed to vinegar by another and different fermentation.

There are several processes used, varying in the kind of installation needed, the time of operation, and the quality of the product.

Slow Process: After the wine has been made by the usual processes of wine-making, it is drawn off the yeast and gross lees and placed in partially filled casks or small closed vats. These containers should have holes at the top of sufficient size and number to supply abundant air and be protected with netting to exclude flies. An addition of 10 per cent of strong vinegar facilitates the process and prevents unfavorable fermentations.

The process requires from 6 to 10 months, according to the temperature of the room. At higher temperatures, 70° to 75° F., the process is relatively rapid. It is very slow below 60° F.

When sufficiently strong, it should be drawn off into full casks and aged for six to twelve months. It may then be filtered or clarified if necessary and placed in bottles or barrels for sale.

Generator Process: Various devices are used to hasten the process of vinegar fermentation. They are called generators and are usually continous in their operation. A generator of a usual size will produce from 25 to 30 gallons of vinegar daily.

The principle used in all of the forms is that of exposing the wine in thin layers or films to the air. As the vinegar bacteria act only in the presence of air, the process is much accelerated. In some forms, the wine is caused to drip slowly over a mass of beech chips or similar material in a tall upright cylinder. In others, the material is placed with the wine in a revolving cylinder so arranged that new portions of the liquid are continually or intermittently exposed to air and the action of the bacteria.

The action of these generators is rapid both because of the full exposure to the air, of the large numbers of bacteria present, and of the high temperature maintained. The high temperature (75° to 80° F.) is produced by the rapid fermentation and by warming the room where necessary.

Vinegars made in this way are not considered of quite such high quality as those made by the slow process, but if the work is skillfully

done and the vinegar is aged for six months or more, the results are excellent. Vinegars made by either of these processes may be either red or white.

Distilled Vinegar: A water-white vinegar can be made by first distilling the wine. The distillate diluted to 10 per cent alcohol is then passed through generators and yields a vinegar of 8 to 9 per cent acetic acid. Such a vinegar is almost neutral in flavor and suitable for pickling and similar uses. It must compete with cheap vinegars and would pay probably only as a by-product for the utilization of inferior raw material.

Cost and Returns: Grape vinegar can be made for approximately the cost of wine or a little more. It should be possible to produce a good vinegar for a wholesale price of 25 cents to 30 cents per gallon and pay $15 to $20 per ton for the grapes.

The market for vinegar is limited, irrespective of price. Perhaps one or two million gallons of good wine vinegar could be marketed at a profit.

5. *Industrial Alcohol*: It has been suggested that industrial alcohol be made from wine grapes by fermentation and distillation with the equipment already installed in wineries.

One ton of grapes of 22° Balling would yield about 20 gallons of 95 per cent alcohol. This, at a high valuation of 50 cents per gallon, would yield $10. About 10 pounds of cream of tartar could be recovered as a by-product. This, at 25 cents per pound, would bring the gross returns to $12.50. After paying the costs of manufacture, this would yield the grower of the grapes about $5 or $6 per ton, which would not pay the cost of cultivating the vineyards.

6. *By-products*: In the manufacture of grape juice, syrup and vinegar, the pomace or solid matters of the grape would remain. The pomace from a ton of grapes weighs from 250 to 350 pounds and contains valuable matters. It contains about 15 per cent of dissolved solids, principally sugar, which could be extracted by water and used for the production of syrup, vinegar or alcohol. A small amount of cream of tartar could also be recovered from the pomace.

The seeds constitute about 4 per cent of the weight of the grapes (about 80 pounds to a ton). They contain about 8 per cent of oil or nearly one gallon to a ton of grapes. The extracted pomace can be dried and the seeds separated by screening and blowing. The oil can be extracted by grinding and pressing, and is excellent for cooking and table use and also for industrial purposes.

The press cake from which the oil has been extracted is useful as a stock feed or can be leached to recover the tannin.

Bulletin 276 of the United States Department of Agriculture, Bureau of Plant Industry, describes methods of utilizing grape seeds. This can be had by applying to the United States Department of Agriculture, Washington, D. C.

C. GRAFTING WITH OTHER VARIETIES.

In some cases it will be possible to change the crop from wine grapes to raisin or table grapes by grafting. This can be done profitably in only a small percentage of the vineyards, but in the aggregate this may represent a considerable area.

Various considerations must be taken into account in deciding on the advisability of making this change.

1. The suitability of the new variety for the local conditions and the probable future for this variety.

2. The cost of the operations, including the loss of crop during the period of change.

3. The probable length of productive life of the grafted vineyards.

1. *Varieties*: Any variety can be grafted successfully on any other variety by the method recommended for this purpose and described in Circular 115 of the College of Agriculture at Berkeley.

Raisin grapes, of course, should be grafted only in the raisin districts, where it is possible to dry raisins profitably. The Black Corinth, from which Greek currants are made, is being grafted on to wine grapes in the coast counties. It is doubtful whether these grafts will be permanent, for reasons discussed later. Moreover, it is still uncertain whether the crop can be dried in the sun in these regions. The grapes ripen early and dry rapidly, so it is possible that the drying may be successful. The yield and the cost of production are still unknown. The indications from the experience of growers and experiments made by the station are that the crops will be smaller than those of other raisin grapes and that the cost of production will be larger. At the prices paid for currants during the last few years, they would probably be profitable in spite of these disadvantages, but it is doubtful whether we could compete with the Greek producers in normal times.

Table grapes in the same way should be considered only in the table grape districts. Only where ordinary table grapes are successful will grafted table grapes give good results.

2. *Cost of the Operations*: A skillful grafter should be able to insert 400 or 500 scions a day in as many vines. He would require two to three men to assist him in digging around the vines, placing the stakes, and covering the grafts. Each vine must be staked and a considerable amount of careful handwork will be needed in suckering and tying up the grafts. The cost of grafting an acre of vines (600) may be estimated as follows:

Cost of Grafting One Acre of Vines.

Grafting, skilled man at $5.00 per day	$7 00
Helpers, 2 men at $3.00 per day	8 00
Stakes, 36-inch, at 4 cents	24 00
Suckering and tying	5 00
Total	$44 00

The vines will bear nothing the year they are grafted. The second year they should bear from one-fourth to one-half of a full crop. To the cost, therefore, must be added the loss of at least one and a half crops.

If the vines are small, 2 inches to 3 inches in diameter, the cost of grafting may be a little less; if they are large, over 4 inches in diameter, it may be considerably more.

3. *Longevity of Grafted Vines*: When an old vine is grafted, the union is never perfect, nor does the wound heal over completely as in the case of walnuts and apples. It is probable that the old stump usually dries and finally dies. If the method described in Circular 115 of the College of Agriculture, Berkeley, is followed, however, this is not of much importance. This method recommends grafting five or six inches below the surface of the soil and the use of a long scion. When this is done the scion makes its own roots. The stock lives long enough to stimulate the scion to a rapid and vigorous growth of top and a rapid and vigorous growth of root, and by the time the stock dies or weakens, it is independently established on its own root system. It is possible that where very large vines are grafted, the presence of the large mass of decaying stock may be a source of danger to the young vine.

The grafting of vines in the coastal and other regions where the phylloxera exists presents peculiar, if not insuperable, difficulties.

All vines under these conditions which are worth grafting at all are on American or phylloxera-resistant roots. In grafting such vines, there are three possible methods, each of which has its disadvantages.

First, we may graft the vines just above the ground in the scion or vinifera part of the vine. This is possible if we cover up the graft with a good mound of loose soil until the union is formed. Such unions, however, as already pointed out, are imperfect and the life of the graft is not likely to be long.

Second, we may graft six inches below the surface, as recommended for vinifera stock. In this case we obtain an excellent growth and the scion variety will form its own roots, as already described. Vines grafted in this way on American vines free themselves more quickly from the stock than those grafted on vinifera vines, such as wine grapes. This would be an advantage but for the presence of phylloxera. The scion roots are susceptible to the attacks of the insect and if the vine depends on them for sustenance, it will be killed. This is exactly what occurs when grafted nursery vines are planted too deeply in new soil. The union between vinifera scion and American stock is imperfect and as soon as the scion roots are well established the food supply flows directly into them and the starved American stock soon dies.

There is a possibility that in grafting old resistant vines in this way the course of events may be somewhat different. If there is an abundant supply of the insects in the soil at the time of grafting, it is possible that

they will congregate on the scion roots, which they prefer. In this case, these roots may be prevented from developing, with the consequence that the food material from the leaves may flow into the American roots and keep them alive and healthy. If this occurs, it is possible that the vines may remain vigorous indefinitely. This is exactly what is reported to have occurred in Champagne where vines grafted below ground on resistant vines in the presence of phylloxera have remained healthy and profitable for over twelve years.

The unions between vinifera varieties and American stocks when the latter are older than one or two years are, however, usually very imperfect and many vines are likely to die, even though the possibility suggested by the experience in Champagne should be realized here.

A third method of grafting would be to graft on to the resistant stock as near the surface of the soil as possible and then to prevent the development of the scion roots by keeping the soil hoed away from the vine and removing the roots as they appear. This is an expensive and troublesome operation and the same difficulty of imperfect unions exists.

D. CHANGING THE CROP.

1. *Removal of the Vines*: In many cases any attempt to save the vineyard by one of the preceding methods is almost certain to be unsuccessful. In such cases, the problem is to remove the vines in the most economical manner and to replace them with the most profitable crop.

The methods of clearing off the vines are similar to those of clearing off brush, though, owing to the uniformity of the vines, more economical and systematic methods can be used.

The vines, if small, can be dug out by hand or pulled out by a team of horses or a tractor. Most stump pullers are unnecessarily powerful and cumbersome. Modified stump pullers have been made which work rapidly and efficiently. Where vines have to be taken out on a large scale, a special tool can be made. Such a tool made by the Killefer Company was used to take out large numbers of vines in the Stanford vineyard in Tehama County. The tool was drawn by a powerful tractor. The cost was $7.59 per acre for labor, distillate and oil, and the gathering and burning of the stumps cost $3.50, or a total of $11.09 per acre. The same tool used by Stern & Son in San Bernardino County was pulled by a 75-horsepower Holt tractor and cleared 16 to 20 acres per day of 10 hours. At Kearney 8,244 vines were removed by means of a tractor and a subsoiler at a cost of $10 per acre, or $0.017 per vine. This included the labor, fuel, and the gathering of the stumps into windrows. In the operation, the land was subsoiled to a depth of 22 inches.

2. *Replanting*: When a piece of land has been occupied by vines for many years, it is doubtful policy to replant with new vines or even with fruit trees.

Owing to our method of handling vineyards with clean cultivation, it is very difficult to keep the soil permanently in good physical condition. The organic matter of the soil finally becomes exhausted and is hard to replace, owing to the difficulty of growing green-manuring crops in a vineyard and the practical impossibility of obtaining sufficient manure or similar organic fertilizers. The only resource at present available is an alternation or rotation of crops.

The best method of renewing the soil of an exhausted vineyard is to replace the vines with alfalfa wherever this crop can be grown profitably. After a period of several years, the land will be in excellent condition again for vines or fruit trees. Where alfalfa can not be successfully grown, annual crops should be grown for several years before replanting vines. If a heavy growth of bur clover, alfilaria or similar plants can be plowed in the year before replanting, the vines will have a much better opportunity to develop well.

E. SUMMARY AND CONCLUSIONS.

The possibilities of the salvage of wine-grape vineyards will vary with their location and condition.

Three typical regions may be considered, viz., those characterized by the growing of (*a*) raisins, (*b*) table grapes, (*c*) dry-wine grapes.

San Joaquin Valley: Young vineyards (under 10 years) in good condition may be transformed into raisin or table-grape vineyards by grafting. The cost may be estimated at $35 to $45 for the operation, or, if we include the loss of one and one-half crops at $15 per ton, a total of about $150 per acre.

The crops of older vines may be sun-dried. Whether this will be permanently profitable is doubtful, but at present prices would pay fairly well. It might tend to disturb the market for raisins.

A limited portion of the crop could probably be used for grape syrup and yield a fair price to the growers. It is a question whether this industry could be developed profitably on a large scale, if at all, in time to save any appreciable part of the wine-grape vineyards.

Removal of the vines at a cost of $10 to $15 per acre and substitution of an annual crop seems the only recourse in many cases.

These conclusions apply to any districts where the sun-drying of grapes is feasible.

Sacramento Valley: The grafting and removal of wine grapes are practicable under the same conditions as in the San Joaquin Valley. Drying wine grapes may also be successful. Here, however, it will be necessary to adopt the methods of dipping and sulfuring used for Sultana raisins and perhaps in most cases the use of evaporators. If the dried grapes are to be used for wine, artificial evaporation is to be preferred.

The Coast Counties: In the dry-wine regions of the coast counties the possibilities of salvage are less than in the interior. Changing the varieties by grafting is almost certainly useless, both because of the difficulty of grafting on resistant vines, and because of the improbability of growing raisin or table grapes profitably except in rare cases.

If the drying of wine grapes for wine-making purposes should be feasible, the coast county grapes dried in evaporators will undoubtedly be superior.

If grape juice of fine quality can be marketed profitably, it is the best grapes of the coast counties that must furnish the raw material.

For the cheaper canned Muscat juice, it is probable that the color and acidity of the coast grapes may be useful in giving variety and freshness and thus utilize a small portion of the crop.

It seems inevitable, however, that most of the wine grapes of this region will have to be abandoned or removed. The case is more serious here than in the interior, as much of the land is unsuited to any other crop, or much less profitable.

A careful survey of a typical area has been made by C. F. Shaw of the College of Agriculture. This area includes 21,365 acres of grapes in the Healdsburg district of Sonoma County and includes all the vineyards from Sebastopol and Santa Rosa north to the Mendocino line. According to this survey, 45 per cent of the vineyards are on soil well suited to other fruits. The loss in these would be confined to the cost of changing the crop and the loss of crop during the process. Of 27 per cent of the vineyards, the soil can be used for other fruit, but with less profit than with grapes. Here the loss would be greater. In the remaining 28 per cent, the soil, after the vines are removed, is only adapted for pasture. Here the loss would be almost total.

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Dried Wine Grapes

BULLETIN No. 15

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STATE BOARD OF VITICULTURAL COMMISSIONERS

SACRAMENTO, CALIFORNIA, JUNE 15, 1919

THE MARKET FOR DRIED WINE GRAPES.

E. M. Sheehan.

The problem of marketing dried wine grapes is one of absorbing interest at this particular time. It is not the intention to convey the idea that these wine-grape raisins will seek selling markets for use for other than wine-making purposes. Indeed, the main thought is that use may be found for them where manufacture of wine may be carried on, and where it is not unlawful to so use this dried product.

If the wine-grape vineyards of California are not to be uprooted, if wine grapes are to be made imperishable by drying either by means of the sun or by artificial evaporation, if profitable export markets may be found in different parts of the world, if consumption of them in the United States for commercial and home use in making syrup and unfermented grape juice may be accomplished to great extent throughout the nation, it is desirable that prompt efforts be made to ascertain in as definite a manner as possible just what developments in this direction may be expected.

We may just as well come to the early conclusion that if prohibition of the use of all alcoholic liquor is the law of the land, there will be many violators of that law. To undertake the work of depriving the population of all material that might be converted into alcoholic drink would be an impossibility. Dried grapes and raisins of all sorts

and descriptions would have to be prohibited in manufacture and transportation. Unfermented grape juice would become a prohibited article. Sweet apple cider would necessarily come under the ban and there might be mentioned hundreds of other articles of food and drink any one or all of which would produce an alcoholic drink by simple processes.

Therefore, we must agree that there could never be reasonably expected any laws by state or government prohibiting the sale and transportation in this country of any variety of raisins. Even ardent prohibitionists could not afford to urge such legislation because they have put forth the general propaganda that wine grapes may be used for many other than wine-making purposes. The extent to which they would so be used is the questionable subject, and yet each individual may fully realize his position as a violator of the law in the event of national prohibition of all alcoholic beverages.

The incentive to produce wine-grape raisins during the coming vintage season is before all grape growers. At this writing the price of 10 cents per pound is freely offered and many hundreds of tons already have been contracted on a basis of this price and less. The market apparently is firm and, therefore, the inducement is exceedingly interesting. There are no dried wine grapes to be bought from producers out of last year's crop and for some unexplained reason there is ready sale for raisins of the 1919 yield.

The thought of using wine-grape raisins for other than wine-making purposes must not be overlooked during the progress of the attempt to find markets for this particular variety of raisins. Indeed, some of the wine grapes might be seeded with profit, and then again there may be found uses for these grapes in the making of confections and in baking. They could not compete, however, with standard and high-grade raisins made from the Muscat and Sultanina grapes, and altogether the possibilities of the wine-grape raisin as a competitor of standard raisins produced in California are matters of conjecture and uncertainty at the present moment.

The State Board of Viticultural Commissioners in co-operation with the State Market Director has begun an investigation of the possibilities of foreign markets for dried wine grapes and the dried culls and second-crop table grapes. Already letters have gone out to many established agencies in Europe and the Orient inviting them to interest themselves in the subject with a view to developing extensive trade

in this commodity. It is possible that brewing plants to be erected in China and Japan may equip themselves for wine-making as well and this would afford a large market for dried grapes.

The writer believes that it is possible to accomplish satisfactory results by proper co-operation among wine-grape growers. He advocates the organization of the growers into a co-operative marketing association for protective purposes and predicts success for it if vineyardists give it general support.

It is not desirable to go into detail at this time, for the subject needs thorough discussion in the viticultural sections of the state, and no doubt this will be undertaken shortly.

METHODS AND RETURNS.

By Frederic T. Bioletti.

After studying the various means of utilizing the wine grapes of the state in case that wine-making should be definitely prohibited during the vintage of 1919, it seems certain that the only profitable means at present applicable to any large portion of the crop is drying.

In districts where the Muscat is easily sun-dried, the methods in use for ordinary raisins can be employed. In the cooler and later raisin districts, the methods of dipping before drying, in use for bleached Sultaninas, would be necessary. In the coast counties and in the central part of the Great Valley, which produce the bulk of the wine grapes, the only practical method of drying is by the use of evaporators. It seems probable that the use of evaporators for this purpose may be advisable in all cases, as the product is better suited for wine-making than that obtained by sun-drying.

As dried wine grapes will probably find their principal use in wine-making, it is necessary that the fresh flavor of the grapes, and especially their color, should be as little changed as possible. Drying directly in the sun destroys the color of red grapes completely. Some of this color is retained by grapes dried in an evaporator. The flavor of fresh grapes is also retained better by the product of an evaporator, especially if the drying temperature is kept somewhat lower than is usual with other fruits.

The changes of flavor and destruction of color in drying are due to chemical actions of an oxydizing nature. These can be controlled to some extent by means of sulfites or sulfur fumes. The bleaching action of sulfur fumes is only temporary unless it is carried too far. The sulfur dioxid of the fumes combines with the coloring matter and forms a colorless compound. The coloring matter is thus protected from the action of oxygen. During drying and during fermentation if the dried grapes are used for wine-making the sulfur compound is broken up, the sulfur dioxid disappears, and the color returns.

The sulfur dioxid will gradually corrode the zinc on the galvanized wire trays, but they can be used many times, especially if they are protected with a covering of paraffine. They are used in this way in sulfuring apples for drying.

It has been abundantly demonstrated that wine satisfactory to the consumer can be made from dried grapes. The product is not equal to that made from fresh grapes, but will be accepted if the latter is

unavailable. During the phylloxera crisis in France, millions of gallons of wine were made in Cette and Marseilles from dried grapes imported from Turkey and Greece. These grapes were all sun-dried.

A few small tests made in California indicate that the quality of wine made from grapes dried in an evaporator will be better, especially in the matter of color.

The volume of wine that can be made from a given quantity of dried grapes will depend on the ripeness of the original grapes, the amount of water retained by the dried grapes and the alcoholic strength of the wine desired.

A ton of fresh grapes with 23 per cent of sugar will yield about 550 pounds of dried grapes. If we ferment this amount with 180 gallons of water we can obtain 180 gallons of wine with 11.5 per cent of alcohol. These figures are based on analyses of Californian dried grapes and on tables compiled by J. Audibert* based on actual practice.

To make wine from dried grapes they must first be soaked in water until they have imbibed the water they lost in drying. They must then be passed through rollers to break the skins. By soaking in water of 150° F. the process is hastened and the crushing is unnecessary, but the resulting mixture must be cooled artificially. Otherwise injurious fermentations would be likely to occur.

In any case, after crushing or cooling, a good vinous fermentation must be started by the use of a pure selected wine yeast. In all other respects the operations are identical with those used in making wine from fresh grapes.

There seems every prospect that the production of dried grapes this year will yield a profit sufficient in many if not most cases to pay not only a good to fair profit to the grower of the grapes, but the whole cost of the evaporator from the first season's run.

This opinion is based on the prices paid and offered for dried wine grapes, on the known drying ratios, and on estimates of the cost of an evaporator and of the cost of its operation.

Wine grapes have been dried for several years at the Kearney Experiment Vineyard. The average drying ratios and the weight of dried grapes obtained from a ton of fresh grapes are shown in the following table:

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*J. Audibert, "L'Art de faire le vin avec les raisins secs." Marseille, 1882.

AVERAGE DRYING RATIOS OF WINE GRAPES.

(Based on three crops of 11 varieties grown and sun-dried at Kearney Experiment Vineyard.)

Balling °	Drying ratio	Pounds dried per ton fresh
17	4.56	439
18	4.41	454
19	4.26	470
20	4.10	488
21	3.94	508
22	3.77	531
23	3.60	556
24	3.42	585
25	3.23	619
26	3.02	662
27	2.77	722
28	2.42	826

These yields of dried wine grapes are somewhat higher than is obtained from Muscats or Sultanina. The riper the grapes, the higher the yield of dried product. The increase averages about 35 pounds of dried grapes per ton of fresh for each added degree of sugar, or over 7½ per cent.

On a vineyard with a crop of five tons per acre, the increase in gross returns, if the dried grapes were sold for 7 cents a pound, would be over $12 per acre for each degree of sugar. The drying ratios that would be obtained in an evaporator might be slightly higher than those of sun-dried grapes given in the table.

At present prices for labor and material it may be fairly estimated that the actual running cost of an evaporator drying six tons of fresh grapes per 24 hours would be close to $6.00 per ton of fresh grapes.

Basing estimates on these figures the returns from drying wine grapes would be about as shown in the following table:

RETURNS FROM DRYING WINE GRAPES.

(Per ton of fresh grapes.)

	20° Balling			25° Balling		
	5 cents	6 cents	7 cents	5 cents	6 cents	7 cents
Gross	$24 40	$29 28	$34 16	$30 95	$37 14	$43 33
Cost*	6 00	6 00	6 00	6 00	6 00	6 00
Net	$18 40	$23 28	$28 16	$24 95	$31 14	$37 23

*Cost of drying estimated at $6 per ton of fresh grapes.

If now we take an average sugar content of the grapes as 23° Balling and a price of 7 cents per pound for the dried grapes, we get for a

season's run of 30 days for an evaporator drying six tons every 24 hours the following balance sheet:

Grapes, 180 tons at $20	$3,600
Drying, 180 tons at $6	1,080
Total cost	$4,680
Dried grapes, 100,000 pounds, at 7 cents	7,000
Net profit of drying	$2,320

As 7 cents per pound is being offered for the coming season, it seems perfectly safe to invest in an evaporator of moderate cost.

The evaporator described by Professor W. V. Cruess is cheap and therefore not quite so efficient as one more solidly and carefully constructed. It will undoubtedly, however, do the work needed and last several years without great expense for repairs.

AN EVAPORATOR FOR WINE GRAPES.

By W. V. Cruess.

After studying numerous home-made evaporators which have been used for drying grapes in various parts of the state the form described here appears to be the most suitable for the drying of wine grapes during the coming season. It can be easily and quickly constructed by local carpenters and plumbers in any district; it has proved in several years' trial in Fresno County to be a satisfactory and practical type, and apparently is of such design that no patent rights are violated in its construction. This evaporator is also suitable for drying rain-damaged raisins or prunes and for other fruits or vegetables.

Other types of evaporators can be used. The most important are described in Circular 213 of the California Experiment Station.* A list of commercial evaporators suitable for this purpose will be found at the end of this bulletin.

A brief summary of the principles of evaporation as applied to the drying of grapes will give a clearer understanding of the requirements that must be fulfilled in the building and operation of a grape evaporator.

A. PRINCIPLES OF EVAPORATION.

The principal object to be attained in evaporation is the removal of enough of the moisture from the fruit to prevent spoiling of the dried product in storage or shipment. This, in the case of wine grapes, must be accomplished not only economically, but also in such a way that as much as possible of the grape flavor and color are retained.

Evaporation is the change of water from the liquid state to the gaseous or vapor state. Heat is necessary for this change.

The necessary heat may be furnished naturally by the sun or may be obtained by the burning of fuel. Sun evaporation changes the color and flavor more than drying in an evaporator.

The moisture evaporated by heat is taken up and carried away by the atmosphere. In order that evaporation may be rapid and continuous, the moisture-laden air must be removed rapidly and continuously; that is, movement of air through the evaporator is essential.

The volume of air necessary depends upon two factors: the temperature of the air and its moisture content or "humidity." Each 27° F. rise in temperature doubles the moisture-absorbing capacity of air—for

*Evaporators for Prune Drying, W. V. Cruess, University of California Agricultural Experiment Station. May be obtained free of charge upon application to the College of Agriculture, Berkeley, California.

example, a given volume of air at 154° F. has about twice the moisture-absorbing power of the same amount of air at 127° F. Air on a rainy or foggy day has less moisture-absorbing power than air on a dry summer day. This affects the volume of air that it is necessary to use. About 65,000 cubic feet of air falling 1° F. will furnish enough heat to evaporate one pound of water, or 2,600 cubic feet falling 25° F. will be necessary to accomplish the same result. The last figures are convenient as a rough measure of the amount of air necessary under average conditions, because the air will in most grape evaporators enter the drying room at 145° F. to 150° F. and leave it at about 25° F. lower.

A large amount of heat is unavoidably lost during the operation. Some radiates from the walls of the evaporator; some is consumed in warming the fruit from outside temperatures to the temperature of the evaporator; but the largest loss is in the air leaving the evaporator. The extent of this last loss is shown by the fact that during summer the outside air, averaging, say, 80° F., enters the drying room at 145° F. and leaves it at 120° F. The air is heated 65° F., but only 25° F. of the added heat is used. Thus more than half of it is lost. Theoretically, we would be able to use the heat more completely if we permitted the air to become thoroughly saturated with moisture before leaving the drying room. Practically, this is not feasible, because the fruit gives up its moisture very slowly to air that is nearly saturated with moisture, and to obtain a reasonable rate of drying the air must be allowed to leave the evaporator only partially saturated. Tests reported by the Association of American Heating and Ventilating Engineers indicate that on the average only about 40 per cent of the heat furnished to the evaporator is actually utilized in evaporating moisture from the fruit.

Other things being equal, the rate of evaporation is proportional to the volume of air passing through the evaporator and the temperature of the air. It is possible, however, to reach a point where the moisture in the interior of the fruit can not diffuse to the surface as rapidly as it is absorbed by the air. This results in drying out and hardening of the surface of the fruit, a condition termed "case hardening." This condition greatly slows up the drying process. It is not believed that grapes will exhibit this phenomenon except near the end of the drying period because their juicy nature will permit the rapid diffusion of moisture.

There is for all fruits and vegetables, when dry, or nearly dry, a temperature above which rapid deterioration takes place. For grapes of the Sultanina variety, this temperature has been found to be about

145° F., and it is believed that wine grapes are no more resistant; 145° F. is a very much lower temperature than is used for vegetables, or even for prunes. This relatively low temperature makes it necessary to use larger volumes of air to secure a rate of evaporation comparable to that attained in drying other products. This factor has been taken fully into account in the design of the evaporator to be described.

FIG. 1. An evaporator near Fresno used in drying rain-damaged Muscat grapes. The evaporator described in this publication is very similar to the one illustrated.

B. TYPES OF EVAPORATORS.

There are a great many different evaporators but they may be placed in a few classes, the most important of which are outlined in the following paragraphs:

1. *Air Blast Evaporators.* This type of evaporator usually consists of a long horizontal or nearly horizontal chamber in which the fruit is placed for drying. The fruit may be on trays or may travel through the chamber upon superimposed belts or wire-cloth conveyors.

A fan and air-heating system are located at one end of the tunnel. The fan draws or blows the air through the heating system and forces the heated air over the fruit in the drying chamber.

In some cases, the fan and heating system are at opposite ends of the drying chamber and the air is drawn through the evaporator by means of a suction or exhaust fan. It is believed that this system creates a more uniform distribution of the air and more uniform rate of flow throughout the drying compartment.

The exit of the dryer may connect to a ventilator which assists the fan to produce circulation of the air, but the action of the ventilator

is of secondary importance. Usually the outlet end of the evaporator is left open and the spent air allowed to escape freely into the outside atmosphere.

The air-heating system may consist either of steam coils or of a furnace and hot-air pipes. The latter system is just as satisfactory and is very much cheaper and more economical to operate. It is the one recommended for the average grower.

2. *Evaporators Depending Upon Ventilators for Air Circulation.* The construction of this class of evaporators varies greatly, but, in all of them, air circulation is accomplished by means of ventilators and natural draft. The draft depends upon the tendency of hot air to rise. The ventilator consists of a stack connected to the outlet of the drying chamber.

The compartment containing the material to be dried is situated above a furnace room or "furnace pit." The heat generated in the furnace room rises through the drying chamber and the moisture so liberated is carried away by the ventilator. Air is admitted to the bottom of the furnace room and the rate of evaporation is controlled by the rate of air flow and size of the fire in the furnace. In some dryers of this class a boiler and steam pipes instead of a furnace are used as a source of heat.

The Oregon tunnel, the hop kiln, the stack evaporator, and the cabinet evaporator all belong to the ventilator class. These will be found described in Circular 213, University of California Agricultural Experiment Station, which will be sent free on application to the College of Agriculture, Berkeley.

3. *Distillation Types of Evaporators.* The United States Forestry Service recently described a dryer for lumber based upon the distillation principle. The same plan has been applied to a dryer for fruits by Luther of Washington.

In these evaporators the moisture is driven out of the material by heat from steam pipes placed below the lumber or fruit as the case may be. The moisture-laden air and steam come into contact with a water condenser which precipitates the moisture as water. The vapor driven off by the steam pipes flows continuously toward the condenser for much the same reason that air rushes into a vacuum. A small dryer of this type may be seen at the winery of L. J. Wetmore, Stockton. No large installations of this type exist in California at present.

4. *Vacuum Evaporators.* Fruits will give up their water at very low temperatures under a vacuum. This principle is used in the tropics

in the evaporation of bananas and in many industries in drying delicate chemicals. The evaporators are too complicated and expensive for the average grower. It is possible to attain a higher quality of dried product in a vacuum evaporator than in any other form.

C. CONSTRUCTION AND USE OF A GRAPE EVAPORATOR.

Only one form of evaporator will be described. It is the one which seems, with our present knowledge, to be the most satisfactory for the average grower. It can be built smaller than the dimensions given in the following specifications. If greater capacity is desired, it is recommended that the number of units rather than the size of the evaporator itself be increased. Increase in the size of the unit has been found by practical experience to greatly reduce the rate of drying and the efficiency of the plant.

FIG. 2. Evaporator near Fresno, equipped with both fan and ventilator.

1. *General Specifications.*

(*a*) Drying tunnel, 30 feet long, 7 feet high, 6½ feet wide. Frame of tunnel of 2″ x 4″ material, and walls and doors of 1″ x 4″ T. & G. pine. Floor of tunnel to be of gravel. Ceiling of tunnel flat and of same construction as walls. Tunnel to be connected to furnace room, as shown in figures 3 and 7.

(*b*) One wall of tunnel to be made up of eight doors, each 40″ x 7′. Doors to be swung as indicated in figures 3 and 4. The space covered

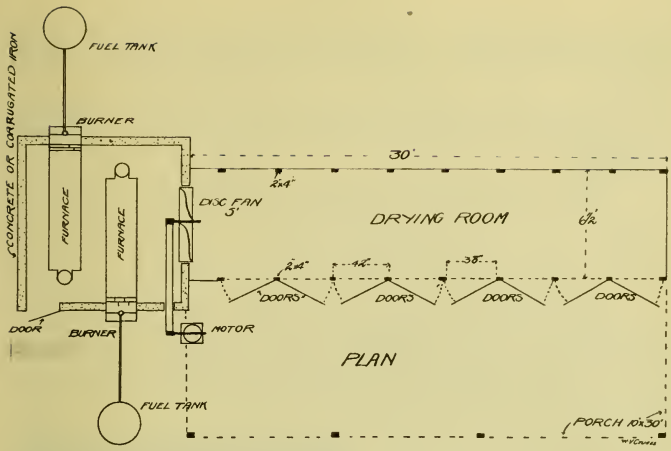


FIG. 3. Plan of dryer, showing relative positions of drying room, furnace room, porch, and fan. (See figures 4 and 5 for track system.)

by each door forms a compartment which will hold one carload of two stacks of 3′ x 3′ trays. There are eight compartments in all. Doors should fit tightly to minimize air leakage.

FIG. 4. View of an evaporator in Fresno, illustrating track system and method of closing and fastening doors. Note transfer car in foreground. This type of car and track is recommended.

(*c*) A porch with slant roof which covers not only the porch space, but also the drying room. See figures 3 and 13. Porch open at side and ends. Roof of 1″ x 12″, covered with building paper, or shingled roof. Porch to cover area of 10 feet by 30 feet besides drying room.

(*d*) Transfer track as shown in figure 5. About 4½ feet from doors of drying tunnel; equal in length to porch. Track to be level with surface of ground and to consist of 4″ x 4″ scantlings with steel strips spiked to surface as shown in figure 4. This steel to be of type used in raisin dryers in Fresno and known as "eight pounds per yard steel." Tracks to be of width of transfer truck used in raisin dryers in

Fresno; *i. e.*, about 27″. Ordinary prune dry yard truck and track can be used instead of above. In this case, dry yard rails and ties would be installed.

(*e*) Tracks for the drying room, one set for each compartment, as shown in figure 5. Tracks and rails of same construction as transfer

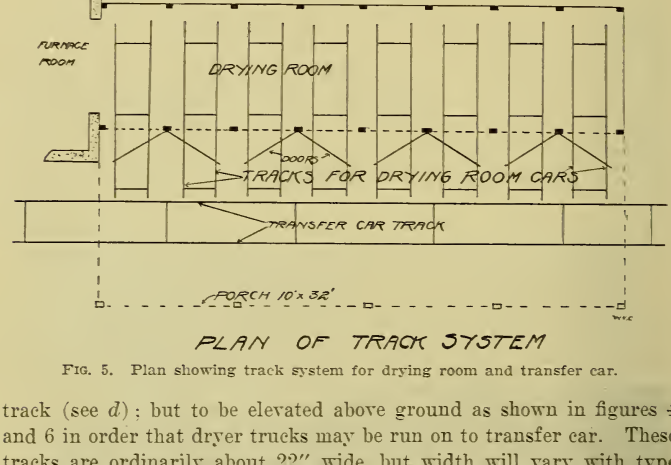


FIG. 5. Plan showing track system for drying room and transfer car.

track (see *d*); but to be elevated above ground as shown in figures 4 and 6 in order that dryer trucks may be run on to transfer car. These tracks are ordinarily about 22″ wide, but width will vary with type of car used. Prune dry yard rails and ties may be installed.

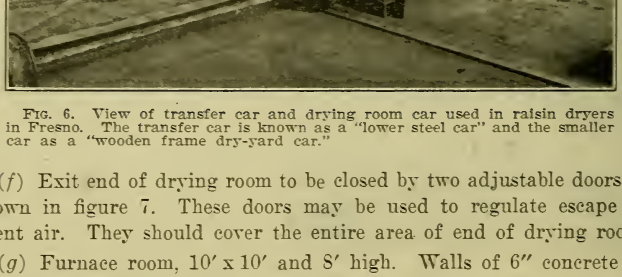


FIG. 6. View of transfer car and drying room car used in raisin dryers in Fresno. The transfer car is known as a "lower steel car" and the smaller car as a "wooden frame dry-yard car."

(*f*) Exit end of drying room to be closed by two adjustable doors as shown in figure 7. These doors may be used to regulate escape of spent air. They should cover the entire area of end of drying room.

(*g*) Furnace room, 10′ x 10′ and 8′ high. Walls of 6″ concrete or corrugated sheet iron, double walls on 4″ x 4″ wooden frame; ceiling of

corrugated sheet iron; floor dirt, cement or brick, as desired. To be connected to drying room as shown in figures 3 and 7.

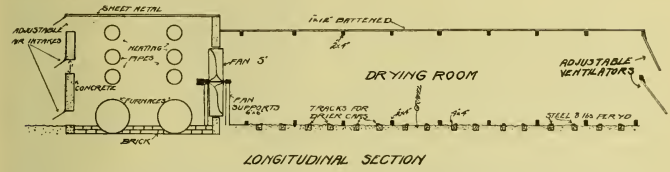


FIG. 7. Longitudinal section of furnace room and drying room, showing air intakes of furnace room and air outlets of drying room.

(*h*) Furnace room to contain two furnaces preferably of boiler steel and cylindrical, 5 to 8 feet long and 24 to 30 inches in diameter. Open at one end to receive burner; opposite end fitted to receive 10-inch or 12-inch sheet metal pipe. (See figure 11). Furnaces may, however, consist of 110-gallon gasoline or distillate drum with lower head removed and upper head fitted with hole and flange to receive 10- or 12-inch pipe. (See figures 11 and 12.) Yandle wood-burning furnaces, large size, may be used to advantage. (See list of dealers, page 27.)

FIG. 8. Disc fan in place in a Fresno County dryer. Note frame used in mounting fan and pulley. This is a six-foot disc fan made in Fresno.

(*i*) Furnaces to connect to 12-inch heavy gauge sheet-iron pipe which is led back and forth across the furnace room three times as shown in figure 11. Pipes to be made of heavy gauge black sheet iron. All joints to be smoke-tight and to slope upward from furnace to smokestack. It is advisable to have the sections of pipe joined in such a way that they may be taken apart easily for removal of soot; or to have an extension of each section extend through the furnace wall with protruding end covered with removable cap to facilitate cleaning of the pipes.

(*j*) Two distillate or oil burners, or, if dryer is located in region where wood is cheap, two wood-burning furnaces; *i. e.*, one for each of the furnaces noted under *h*. If wood is burned, the furnace and burner will be one; if oil or distillate is burned, the furnace and burner are

separate unless a forced draft burner is installed. The ordinary gravity type of distillate burner, large size, has been found to be thoroughly satisfactory in Fresno County in numerous evaporators. See list at end of this publication for names of dealers who can supply burners and wood-burning furnaces. Gravity burners to be mounted in small fire-brick chamber as shown in figure 11. The size and shape of chamber will depend on type of burner selected.

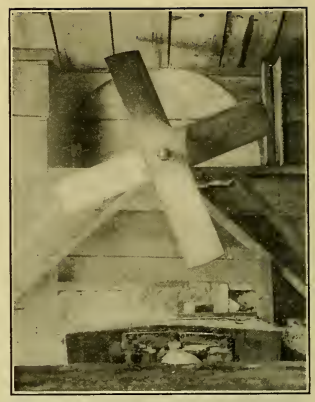


Fig. 9. Homemade wooden fan, about three feet in diameter, in a Fresno dryer. When operated at high speed this fan gave good results.

(*k*) Five-foot disc fan attached to motor or engine by proper size pulleys to give 300 revolutions per minute to fan. See figure 8 for method of mounting fan. Position of fan in relation to furnace and drying rooms shown in figure 7. Other types of fans delivering an equivalent volume of air can be used, but are much more expensive and require greater horsepower for operation.

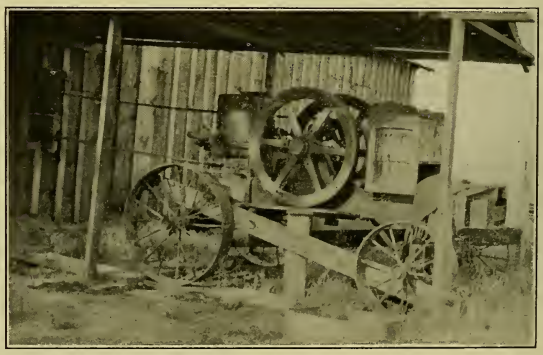


Fig. 10. Portable gasoline engine used near Fresno to operate fan. Tractor engines are often used.

(*l*) Wall of furnace room opposite fan to be made with three horizontal doors each 10′ x 1′ as shown in figure 7. These openings to be fitted with adjustable hinged doors as indicated in figure 7. These openings to be used to regulate air intake.

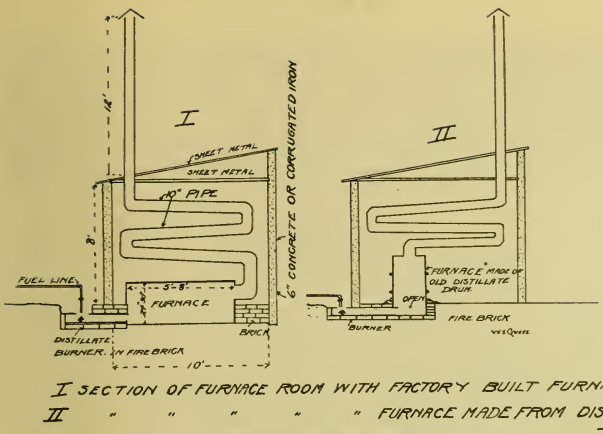


FIG. 11. Sections of furnace rooms showing two methods in use of constructing the furnace. The furnace shown in "I" is of heavy boiler plate and is much more durable than the inverted gasoline drum used for a furnace in "II." All joints must be smoketight.

(*m*) Furnace room to be covered with corrugated iron roof and ceiling of same material as shown in figure 11.

FIG. 12. An old gasoline drum converted into a furnace. The drum rests on the ground over the burner and fire chamber, which is made of fire brick. The fire chamber is about 18" wide, 12" deep, and about 36" long.

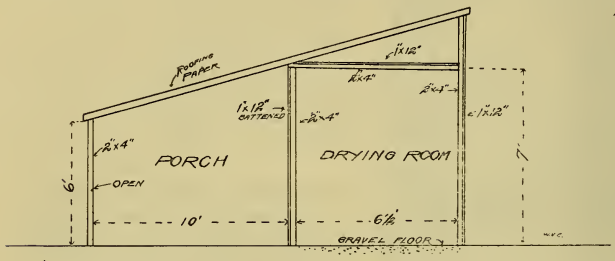
(*n*) Trays: Six hundred trays, 3'x3', to be made of spruce or pine shook of the following dimensions:

2 pieces $1\frac{1}{2}''$ x $1\frac{1}{2}''$ x 36".
2 pieces $\frac{7}{8}''$ x $1\frac{1}{2}''$ x 33".
2 pieces $\frac{7}{8}''$ x $1\frac{1}{2}''$ x 36".
2 pieces $\frac{3}{8}''$ x $\frac{7}{8}''$ x 33".
1 piece $\frac{7}{8}''$ x 1" x 33".
1 piece $\frac{3}{8}''$ x $\frac{7}{8}''$ x 34".

The bottoms of trays to be made of $\frac{1}{2}''$ or $\frac{1}{3}''$ mesh heavy soldered joint wire screen. See figure 14 for appearance of trays. Trays with wooden bottoms and 3'x6' in size as shown in figure 15 may be used but are not so satisfactory as the screen trays. The ordinary Muscat sun-drying trays shown in figure 16 are used in most Fresno County dryers, but no wooden tray is as satisfactory as the screen trays.

(*o*) Dipping machine: One hand-power prune dipper. See list at end of this publication for names of firms dealing in dipping apparatus. A dipper

can be made of a sheet iron tank 3 feet long, 2 feet wide and 18 inches deep, mounted in brick over a distillate burner or wood grate; with a basket of $\frac{1}{4}''$ mesh screen large enough to hold 40 to 50 pounds of grapes and arranged conveniently for dipping grapes in the boiling solution in the tank; and a second tank similar to the first but filled with cold water for rinsing dipping solution from the grapes.



CROSS SECTION OF DRYING ROOM AND PORCH

FIG. 13. Cross-section showing construction of porch and drying room walls.

(*p*) Trucks: One lower steel transfer truck, such as illustrated in figures 4 and 6. Ten upper trucks, ordinary raisin dryer type, shown in figure 6. Prune dry yard trucks may be substituted for trucks specified.

(*q*) Power for fan: One 8-horsepower motor or gas engine, with pulley of such size that 300 revolutions per minute are obtained on fan.

(*r*) Thermometers: One-half dozen dairy thermometers reading to 212° F., mounted near dryer walls at various points in front of small glass windows in order that temperature may be easily read and regulated.

2. *Discussion.*

The drying room specified is of substantial construction. It may be made more cheaply by use of 2″ x 3″ frame covered with $\frac{1}{2}''$ x 12″ pine covered with roofing paper; flat roof of same construction and no porch. This style of construction is quite commonly used in Fresno County; it is satisfactory as long as it lasts. One dryer built three years ago of this construction is still in working order.

The tracks and trucks may be omitted and the trays may be stacked on the dryer floor by hand. This is wasteful of time and labor, but is the method commonly used in the Fresno district. This very materially reduces the cost of construction, but increases the cost of operation and reduces the output.

The furnace room specified is made of concrete or brick in order that the fire risk may be reduced. Sheet metal is sometimes used successfully. An excellent construction is double corrugated iron walls on 4″ x 4″ frame or on angle iron frame. Most of the dryers, however, use wood for construction of furnace room, with the result that it is practically impossible to obtain insurance for them. Concrete or brick is fireproof and reduces the loss of heat by radiation, but it is believed that corrugated iron construction should be selected in most cases. It is cheaper than brick or cement, easily erected, and is ready to use as soon as erected. If an angle iron frame is used it is fireproof.

The most satisfactory type of furnace seen in use was that made of heavy boiler plate; any boiler factory can supply such a furnace; or often a boiler shell may be found in some junk yard for a small price. Most of the Fresno dryers are equipped with old gasoline drums with one head removed and the other fitted to receive a 12- or 10-inch hot-air pipe. See figure 12. Such drums may be had for $7.50 and the cost of cutting out one head and putting flange on the other does not exceed $5.00.

A very excellent furnace is used in Sonoma County in apple dryers and in hop kilns. It is manufactured by the P. A. Yandle Foundry Company, Santa Rosa. It is designed for burning wood but when mounted in brick and made smoketight with fire clay can be used successfully with a gravity distillate burner or with a rotary air blast, crude oil or distillate burner. It is made in two sizes. The smaller size would be suitable for a gravity burner and the larger size for the air-blast burners. It is made of heavy cast iron and is very durable.

The burner recommended is in use in Fresno and Napa counties in various styles of evaporators and has given satisfaction. It will supply enough heat to maintain an old boiler shell at red heat. The burners are sold with full directions for their installation and operation. The usual price is $25. Where it is desired to burn crude oil, some form of forced feed burner will be necessary; the Ray or the Johnson burners will be found thoroughly satisfactory, but electric current must be available because the burner is motor-driven. These burners are also made for distillate. It is possible with the use of one of these force-draft burners to use only one furnace in the heating room if the length of the heat radiating pipes is increased by use of T-joint drums and a greater number of hot-air pipes. Such an installation would have the advantage of fewer working parts for the operator to watch. The rotary burners cost about $90 to $100.

The trays must be of strong construction to withstand the rough usage given in the average evaporator.

The ordinary Muscat tray shown in figure 16 is commonly used in handling rain-damaged grapes in the Fresno County evaporators, but such trays require a large amount of heat to warm them to the temperature of the evaporator; drying takes place on one side of the bunches of grapes only and the trays do not permit unimpeded circulation of the air. The same objections apply but in a less degree to the 3′ x 6′ wooden trays shown in figure 15. These last trays are commonly used in drying Muscat grapes for cap-stemming for the reason that the raisins do not stick so badly to wooden trays as to wire screen.

Most of the evaporators now in use are too long, with the result that the rate of air flow is greatly retarded and the grapes near the outlet

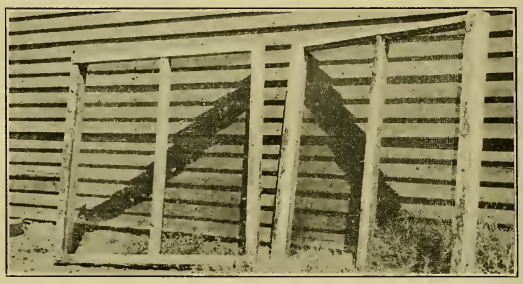


FIG. 14. Screen-bottom trays, 3′ x 3′, of type recommended in specifications. Sides of trays are higher than ends, thus leaving a space for the passage of air between the trays.

of the dryer do not dry rapidly or uniformly. The evaporator should be short—not greater than 30 feet.

In some evaporators, it has been found desirable to place between each pair of drying compartments baffles about one foot in width and equal in length to the width of the drying tunnel. These may be mounted on $\frac{3}{8}''$ iron rods and so arranged that they may be set at any desired angle. In this way the air blast may be deflected upward or downward to secure uniform distribution of the air and uniform rates of drying throughout the stacks of trays. Three of these between each pair of compartments will suffice.

The air intakes and outlets of the evaporator must be ample in size and adjustable in order that the temperature and air flow may be easily regulated. They must be situated so that the air may enter and escape both at the top and bottom of the respective rooms in order that the full heating surface of the hot-air pipes in the furnace room may be utilized and a uniform flow of air through the drying room be maintained.

Grapes dry much more rapidly if dipped at the boiling point in a dilute lye solution consisting of 1 pound of lye per 30 to 50 gallons of water. Hence, it is recommended that a dipping outfit be installed. The ordinary prune dipper has been used at Lodi for Tokay grapes

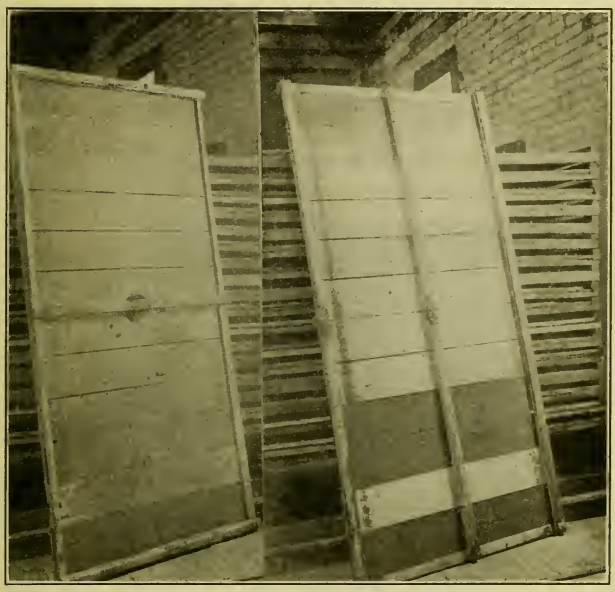


FIG. 15. Wooden trays, 3′ x 6′ in size, used in drying raisins for cap-stemming. Note heavy cleats at ends of trays which give spaces between stacked trays for passage of air; note trays in background stacked on truck ready for the evaporator.

with success. In Sutter County shallow rectangular direct-heated black sheet-iron tanks are used to heat and hold the lye solution and a dipping basket is made of heavy wire screen and of the size and shape of a lug box. Continuous dippers may be obtained from any one of the dry yard supply companies listed at the end of this publication, but these require steam for heating and power for operation. They would only be suitable for the large operator.

White grapes will be improved in appearance by exposing to the fumes of burning sulfur for about 15 to 20 minutes after dipping. It is believed that a similar treatment for red grapes will improve their color for wine-making, as small laboratory tests have indicated.

3. *Operation of the Evaporator.*

The grapes should be evaporated as soon after picking as possible in order to prevent fermentation and molding. Defects that are not serious if the grapes are used fresh for wine-making, may injure greatly the quality and yield when the grapes are dried.

At the dryer, the grapes are dipped in a boiling solution of $\frac{1}{2}$% lye to $\frac{1}{4}$% lye for a long enough period to cause the skins to develop minute cracks. This will usually be not more than 3 to 5 seconds. The grapes are then rinsed in water to remove the adhering lye.

White grapes, and, it is believed, red grapes also, will be improved by a short exposure of not more than 20 minutes to the fumes of burning sulfur; but this operation may be omitted.

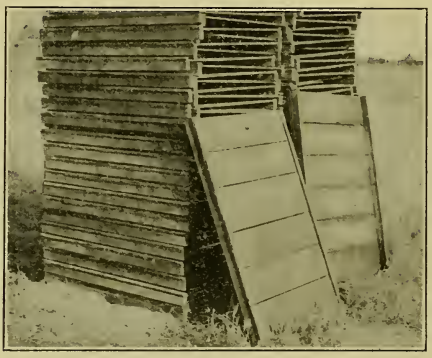


FIG. 16. Ordinary Muscat trays, 3′ x 2′ in size. Sides of $\frac{7}{8}$″ x $1\frac{3}{8}$″ material and bottoms of 6″ x $\frac{3}{8}$″ pine shakes and end cleats $\frac{3}{8}$″ x $\frac{7}{8}$″ x 36″. Not very satisfactory for use in dryer.

The grapes are spread on the trays one bunch deep for most varieties. If the bunches are very small, it may be possible to place the bunches on at least part of the tray area two bunches deep. A 3-foot square tray will probably hold 30 to 35 pounds of grapes. The evaporator will hold about 400 trays or about six tons of fruit at a charge.

The loaded trays are placed on the small dryer trucks which when loaded are transferred to the transfer car by running the dryer car directly on to the transfer car. The dryer car with its load of two stacks of 3-foot trays is then transferred to a drying compartment.

In the meanwhile, the furnaces and fan have been started and the interior of the dryer has been heated to 145° F. Thermometers at various points in the drying tunnel will indicate the temperature.

These can be readily observed if mounted between the drying compartments in front of small glass windows. Such an arrangement may be seen on the second door in figure 4.

The dryer is filled as quickly as possible and air, at not above 145° F., is forced through the dryer until the grapes are dried to a leathery consistency but not to "bone dryness." The finished raisin should contain about 20 per cent of moisture. The University will as far as possible make analyses of samples of grapes for each operator to establish the standard or will forward on request a small sample of dried grapes showing the proper consistency. The amount of moisture is extremely important, because the yield and therefore the profits will vary according to the moisture content up to about 25 per cent, above which molding and fermentation will cause loss on the dried product.

The dried grapes should be packed immediately into insect-proof containers to prevent infestation and entire loss of the dried grapes through moths, unless the grapes are to be shipped to a central packing house and sterilized before packing. The ordinary 50-pound prune or raisin box may be used to advantage. A parchment paper-lined container with an inner seal is best. Large tin cans now used for dried milk and dried vegetables will make excellent containers also. Or, if a supply of puncheons and barrels is on hand, these may be filled and headed up to advantage. These would probably be as cheap and efficient containers as could be found. Exclusion of insects is the thing to be accomplished.

From estimates obtained from those who have handled rain-damaged grapes in evaporators, it is thought that the average cost of drying will be about $20 per dry ton.

D. LIST AND ESTIMATE OF COST OF EVAPORATOR AND EQUIPMENT.

1. One new 7½ or 8 horsepower electric motor, with 3″ pulley and 1200 R. P. M. (or other power equal to or greater than this)		$243 00
2. Two distillate burners, large size, California Fresno burner or Sievert burner, large size, at $25 each		50 00
3. Two boiler plate shells, ¼″ or 5/16″ plate, open at one end, fitted for 12″ stack at other, size about 6′ x 26″, at $50		100 00
Or, two large size Yandle furnaces, hop kiln type, at $105 each	$210 00	
4. One 5′ disc fan, steel blade, complete with 12″ pulley, shafting, boxing and flange; Valley Foundry Company type		75 00
Or, one 5′ disc fan of Sturtevant, American Blower, or Buffalo types	about $200 00	
Or, one Samelson wooden blade disc fan, 5′	25 00	
5. One lower steel Muscat raisin dryer car, Fresno Agricultural Company type		25 00

6. Ten lower Muscat raisin dryer cars, wooden frame, Fresno Agricultural Company type, at $7.50 each	75 00
7. One hand-power prune dipper, about	150 00
8. Two pieces 16-gauge black iron steel riveted water pipe, 12″ diameter, 1′ long, at $1.00 per foot	2 00
Two pieces 16-gauge black iron steel riveted water pipe, 12″ diameter, 6 feet long, at $1.00 per foot	12 00
Two pieces 16-gauge black iron steel riveted water pipe, 12″ diameter, 15 feet long, at $1.00 per foot	30 00
Four pieces 16-gauge black iron steel riveted water pipe, 12″ diameter, 8 feet long, at $1.00 per foot	32 00
Two L's of same pipe at $3.00	6 00
Six return bends of same pipe, at $5.00	30 00
9. Shook for 600 3′ x 3′ trays at 16 cents	96 00
10. Screen for trays, 600 yards (5400 square feet) at $5.45 per 100 square feet, ½-inch mesh, No. 19 gauge	294 30
11. Labor for constructing trays	75 00
12. Tongue and groove pine No. 1 grade, thoroughly dry, 4″ wide, 1000 board feet, at $60 per 1000 for walls, ceiling, doors, and ventilators	60 00
550 feet, 1″ x 12″ rough pine at $36, for porch	19 80
600 linear feet. 2″ x 4″ rough, at $35	14 00
225 linear feet, 4″ x 4″ rough, at $35	9 85
100 linear feet, 1″ x 6″ for door frames	1 75
13. Labor, 2 men, 10 days, at $5.00 each	100 00
14. 60 square yards heavy roofing paper at $3.45 per square	20 00
15. Corrugated roofing, 26 guage:	
12 pieces, 6′ long (210 pounds at 8¼ cents a pound)	17 35
30 pieces, 8′ long (691 pounds at 8¼ cents a pound)	57 80
16. 150 square feet, 24 gauge sheet metal for ends of tunnel and patching	15 00
17. Six dairy thermometers to 212° F.	3 00
18. 180 feet of "8 pounds per yard" steel as sold by Fresno Agricultural Company for raisin dryers at 5¼ cents a pound	25 20
19. 180 linear feet 4″ x 4″ redwood for tracks at $35	8 40
Total	$1,647 45

E. MANUFACTURERS OF COMMERCIALLY BUILT EVAPORATORS.

1. Atlas Heating and Ventilating Company, San Francisco.
2. Banks Evaporator Company, San Jose.
3. Berger & Carter Company, Seventeenth and Mississippi streets, San Francisco.
4. California Dried Products Company, San Francisco.
5. Mr. T. I. Casey, 54 Lake avenue, Oakland.
6. Oscar Krenz Copper and Brass Works, San Francisco.
7. Mr. E. T. Meakin, 409 Sixth street, San Francisco.
8. B. F. Sturtevant Company, San Francisco.
9. J. T. Wann, 1421 Arch street, Berkeley.
10. Young Hardware Company, Napa.

F. FIRMS FROM WHICH EQUIPMENT MAY BE PURCHASED.

Name	Equipment
1. American Blower Company, 667 Mission street, San Francisco	Fans.
2. Anderson Barngrover Company, San Jose	Dry-yard trucks, tracks, dippers, steam heating systems for evaporators.
3. Anderson Steel Furnace and Boiler Works, Salem, Ore.	Furnaces of boiler plate type.
4. Atlas Heating and Ventilating Company, San Francisco	Fans.
5. Berger & Carter Company, Seventeenth and Mississippi streets, San Francisco	Furnaces, trucks, dippers.
6. California Fresno Oil Company, Fresno	Distillate burners, gravity type.
7. California Pine Box Company, Fresno	Shook for trays.
8. Ferguson & Daiken Company, Healdsburg	Heating pipes.
9. Fresno Agricultural Implement Company, Fresno	Trucks and tracks.
10. The S. T. Johnson Company, 1337 Mission street, San Francisco	Forced draft burners.
11. Mailer Hardware Company, Santa Rosa	Heating pipes.
12. Ray Oil Burner Company, 29 Spear street, San Francisco	Forced draft burners.
13. Samelson & Sons, Fresno	Disc fans with wooden or steel blades.
14. Smith Manufacturing Company, San Jose	Trucks, tracks, dippers.
15. B. F. Sturtevant Company, Monadnock Building, San Francisco	Fans.
16. Valley Foundry Company, Fresno	Fans, furnaces, heating pipes.
17. P. A. Yandle Foundry Company, Santa Rosa	Furnaces, wood-burning type, but suited also to distillate burner.
18. Young Hardware Company, Napa	Distillate burners, heating pipe.

Heating pipes can be obtained from any sheet metal shop or large hardware store. Any boiler works can supply a furnace to order or an old boiler shell may be found in nearly every junk yard. Thermometers can be bought from any drug store or dairy supply store.

G. SUMMARY AND CONCLUSIONS.

An evaporator has been described that will hold about six tons of fresh grapes per charge and which can be built for $2,000 or less; by cheapening the materials used in construction and by omitting porch, trucks, and tracks, and commercially built dipper, the cost can be greatly reduced. If a motor or engine is on hand the cost will be reduced at least $200.

This style of evaporator has been used with success in Fresno County for several years, and therefore the specifications are based very largely upon the results of the practical experience of growers.

Evaporators will be necessary in the coast grape-growing counties and the quality of the product will be improved even in localities suited to sun-drying if evaporators are used.

Many different commercially built evaporators are available. The firms listed in this publication are reliable. It is recommended that the prospective builder obtain all information possible from users of commercially built outfits upon performance of their evaporators before purchasing.

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